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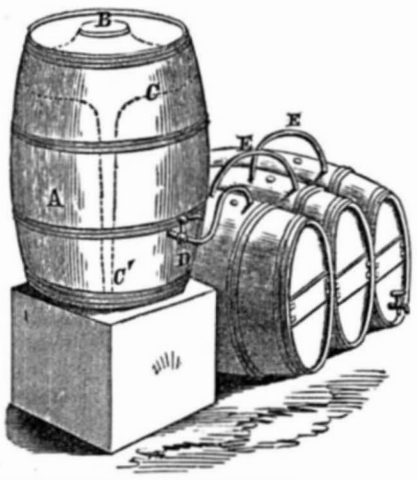
Boyd's Liquor Preserver.

There are many liquors which are far better when first tapped than after the cask has been allowed to remain partially filled, and consequently with an extensive surface in contact with the air, for a considerable period. This evil is so great as to induce, in many instances, the pouring of a quantity of olive oil into the bung, which oil, by spreading over the surface, protects the liquid from injury. The invention now to be described is intended to accomplish the same purpose in a cleaner and far more desirable manner. It consists in providing a thin flexible bag of sufficient size, when expanded with air, to fill the whole cask, but capable of being collapsed to very small and almost inappreciable dimensions as the cask is filled. The air is admitted to the interior of this bag; and as the liquor is withdrawn, the bag expands, and thus affords a free vent, but effectually prevents the actual contact of the two fluids.

In the accompanying figure, A represents a barrel on tap, B a vent hole, C the bag referred to, and C′ a small quantity of shot placed in the bag, which compels a portion to be immersed to a considerable depth in the



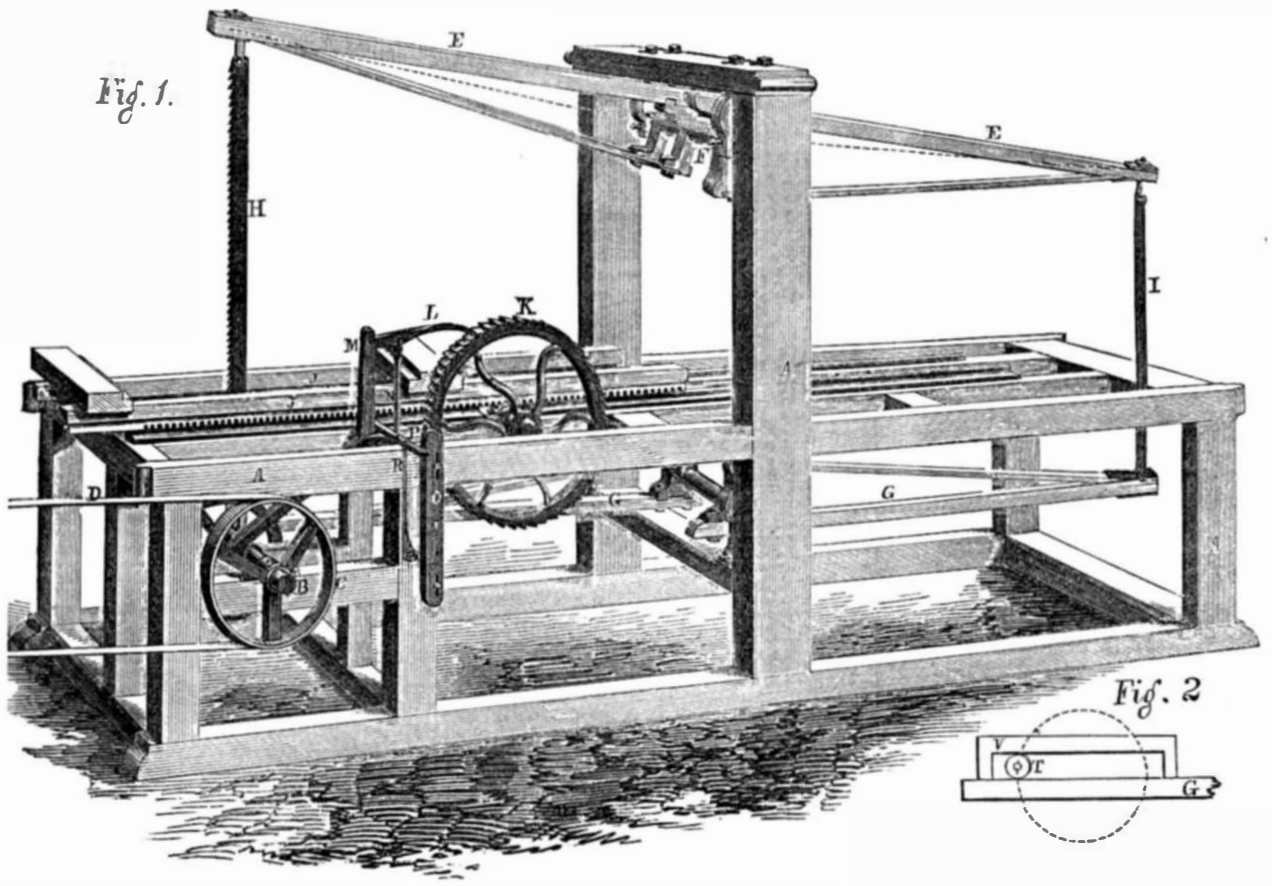
liquid. This arrangement prevents the possibility of the bag becoming entangled in any fold, and ensures its gradual and perfect expansion, as the liquor is withdrawn. D is a discharge tap or cock arranged in the ordinary manner.

It is sometimes much labor to keep barrels perfectly filled with liquor. The gradual change of volume due to fermentation or to other causes induces a sinking of the surface. When it is desired to keep the barrel perfectly filled, small quantities of liquor must be supplied at very short intervals. Our engraving represents a device for keeping any quantity of barrels perfectly filled, by the aid of this invention; the barrels being arranged side by side, and freely connected by the pipes, E. The cock, D, being left open, all the casks are kept perfectly filled, and the access of air to any part of the surface is effectually prevented.

This invention was patented April 21, 1857, by A. F. Boyd, of Zanesville, Ohio, from whom any further information may be obtained.

WHIPPLE'S RECIPROCATING SAW MILL.

Fig. 1.



The mill represented in the accompanying engraving is the invention of Carlyle Whipple, of Lewiston, Me., and was patented on the 13th of January last. In it, the saw is stretched between two reciprocating levers, each resembling the walking beam of a steamboat, the means by which the motion is communicated being represented separately in Fig. 2.

A represents the frame of the mill, and B the driving shaft, receiving its motion from the belt, D, acting on a pulley, C, or in any other suitable manner. E E represent the two parts of the upper beam, and F the rocking shaft or main center on which it is mounted. G G represent the lower beam, mounted on a corresponding center, directly below the other. H is the saw, and I the tie-rod connecting the other extremity of the beams. The length of this tie-rod may be adjusted by a screw, and consequently any desired degree of tension may be given to the saw. J is a carriage on which the saw is mounted; K the ratchet wheel; L the pawl, and M the feed lever, which latter, actuated by a cam on the driving shaft, B, gives motion to L. N is a forked rod by which the pawl L may be lifted out of connection with K by the gravity of weight, O, which is connected to N by a lever, not represented. P is a detaching lever, so mounted as to be pressed by the spring, R, into a notch in the side of O, and sustain it until P is moved by the usual stop, S, under the carriage, by which movement the weight, O, is released, and in its descent lifts the pawl L out of gear. The carriage is gigged back in any ordinary manner.

A natural effect of mounting the saw on levers is to give each end a slight forward and backward motion, in addition to the vertical movement at each stroke. This would tend to induce the saw to advance into the wood during the first half of its descent, and to retreat therefrom during the remaining half, but this effect is modified by the peculiar position of the beams. Both beams are practically straight—that is, the fulcrums or centers of motion lie in a right line between the end centers or those to which the saw and tie-rod are attached, but the beams are not mounted in positions parallel to each other. The tie-rod is considerably shorter than the saw. When the saw is up and ready to perform its downward journey, the position of the beam is such that the top of the saw is thrown back of a right angle line with the carriage, and when the saw is half way down, the lower end commences to recede, giving the sawdust which is cut from the top of the log a chance to escape. The bottom of the saw strikes the wood first and does its work while the top remains back, and when the saw has finished its journey down, it should be at right angles with the log. The top beam can be set forward or back, to give the saw more or less rake forward.

The turning centers upon the lower beam are level when the saw is half way down, and the centers upon the upper beam should be level when the saw is down or nearly so. Both beams are trussed so as to give great strength with a small amount of material, and there is sufficient elasticity to allow for the slight inequality in the strain due to the want of parallelism of the beams. The motion of the crank is transmitted directly, through the agency simply of a suitable well-fitted wheel which travels in a corresponding slot or hollow frame, bolted on the lower beam, as shown in Fig. 2. There is consequently little or no lost motion in the mechanism, and the vertical depth of the mill may be considerably less than usual. The crank is turned in the direction indicated by the arrow, so that greater leverage is obtained when the saw descends; and the invention has been highly commended as a strong and admirable form for all ordinary purposes. It is also applicable for jig saws.

For further information, the inventor may be addressed as above.

Wool.

The Cleveland *Plaindealer* estimates that the aggregate clip of this year will exceed that of 1856 by three millions of pounds. The prices paid for the greater portion range from forty to fifty cents, and in some of the best districts fifty-five and sixty cents have been paid. The amount of cash distributed in Ohio alone for wool this year will exceed six millions of dollars. This State has become the leading wool-growing one in the Union.

The increased quantity is not due entirely to the increased number of sheep, but partly to the fact that the shearing occurred a month later this year than last, and the increase of the growth of wool during this time affords an increase of eight per cent to the clip. Within a few years past, the Eastern States have to a considerable extent abandoned the competition, and left Ohio to furnish the best wools now grown. The counties in the center of that State are now as famous for their fine wool, as they formerly were for their great crops of wheat.

Advance Wages for Seamen.

The practice of paying sailors a portion of their wages in advance originated no doubt in a desire to enable this improvident class to provide themselves with suitable clothing and comforts for the voyage. But this end is so rarely attained in practice, owing to the land sharks, or keepers of sailors' dens, always managing to keep them drunk until they are in debt to the whole amount of their advance wages, that a very earnest and general effort to abandon the practice, has been lately made by ship owners, who, in order to secure crews, have offered higher wages on the new system, but generally with very poor success. The owners of Liverpool packets offer $20 a month, with no advance, or the usual price of $17 and advance; but so far, sailors have accepted the latter price. The ship *Devonshire*, for London, has been put on the shippers' bulletin for $22 per month, without advance, and the ship *Rhine*, also for London, has offered $20, and yet sailors prefer to accept the old terms, $17 a month with the advance; being led on by the landlords whom, apparently, they dare not disobey.

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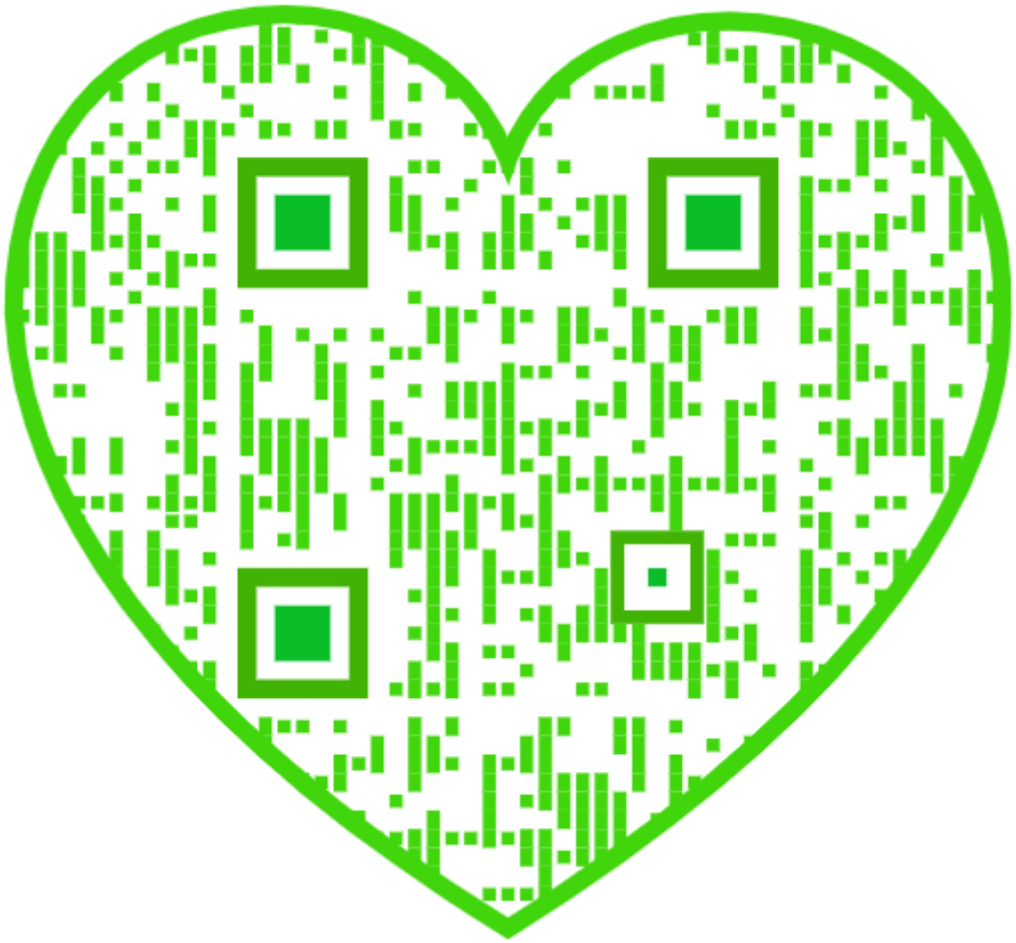

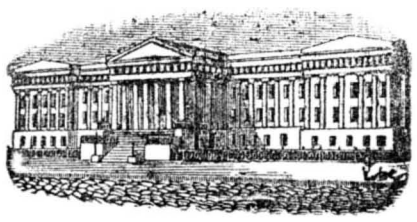

[Reported officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING AUGUST 4, 1857.

POWER LOOMS—Andrew Allen, of Wilmington, Del.: I claim first, The combination of the step-formed indicator, L, attached to the lifting and dropping mechanism of the shuttle boxes, and the adjustable pins, P1 P2 P3 P4, of the pattern chain, substantially in the manner described, for the purpose of controlling the pattern and affording a greater facility for varying the same than the means heretofore used.

I am aware of the means described in the patent of B. H. Jenks, dated October 24, 1851, for varying the movement of the shuttle boxes by an auxiliary wheel, and this, therefore, I do not claim.

But I claim, second, The retarding wheel C, with its pins h h, combined with the pattern chain wheel or cylinder, substantially as described, to arrest the pattern chain or cylinder, when several picks are required to be made by the same shuttle, or with the same filling thread.

Third, The combination of the pins, m m, on the pattern chain or cylinder, and the lever, N, with the pawl, E, of the retarding wheel, for the purpose of causing the operation of the retarding wheel to be suspended under the control of the pattern chain when desired, substantially as described.

[This invention has been applied with great success to the weaving of fancy checks, ginghams, and other fancy goods, and produces a long pattern with but a short pattern chain. It also provides an extremely convenient and ready means of varying the pattern, by simply turning the pins referred to with a pair of pincers, instead of taking them out and supplying others of different lengths, and in new places, as in the ordinary manner.]

TRUCKS FOR LOCOMOTIVES—Levi Bissell, of New York City: I claim attaching trucks having four or more wheels, to locomotive engines in the manner substantially as described, so that the said truck is allowed a lateral motion under the engine, and moves upon a center located between the drivers and the center of the truck, in such a manner that the relative positions of the four or more truck wheels with the driving wheels, as determined by the straight or curved track, shall cause the body of the engine to assume the correct position relatively with said track substantially as specified.

I also claim the inclined planes, o or q, and blocks, n n or p, or their equivalents, in combination with a truck of four or more wheels, having a lateral motion under the locomotive engine the whole constructed and acting substantially as and for the purposes specified.

NUT MACHINES—Robert Brayton, of Buffalo, N. Y.: I claim the use of the trigger, s, spring catch, Q, arm, L, pin r, slide r d V, provided with the spring, e, notch, v, protection, g, and inclined plane, h, substantially as described, and in relation to and being operated by the foot lever, a, and spring, c, constructed and arranged in the manner and for the purposes specified.

WALKING-STICK GUN—Ira Buckman, Jr., of New York City: I do not claim combining a gun and cane together, so that they can be used for either purpose.

But I claim first, Moving the lock piston H, backward, to effect the cocking of the lock by revolving the section T, and its attached spiral cam, T", as described.

Second, Cocking the lock—for retaining the lock piston, H, in position when moved backward to its full extent—by the locking plate, E, dropping into a transverse groove in the top of the piston, as described.

Third, The construction and operation of the trigger, G, as described, which enables the trigger to be closed up against the body of the gun while the lock is cocked.

Fourth, The combination of the locking plate, E, with the trigger, G, as described, by which the strain of the spring of the piston, H, is brought entirely upon the locking plate, leaving the trigger free from strain or pressure, and enabling the trigger to discharge the lock with slight effort.

Fifth, The thimble, V, as described, for the purpose of being moved over the lock catch, E, and trigger, G, to confine and secure them so that the lock cannot be operated without first moving back the thimble.

VAPOR BURNERS—D. H. Carpenter, of Wallingford, Conn.: I claim the bent pipe, or equivalent, mingling reservoir, for mixing the atmospheric air and vapor, as described, and bringing the jet, c, on a level with the igniting orifice, d, by which means the proper draft commingling and heat is attained, and the combination therewith of the check valve, a, which supplies and regulates the quantity of vapor necessary to produce the maximum effect for the purposes designed.

MAKING PAPER—Patrick Clark, of Rahway, N. J.: I am aware that the pump, B, or an equivalent device, together with the pipe, C, entering the vat at Y, is old and well known in connection with such machines as I have described, and the pipes, F and K, are also old and well known.

Therefore I do not claim those pipes separately and in themselves.

Neither do I claim to have invented the use of a cistern to collect the water which is separated from the pulp during the process of forming pulp into paper by means of a machine.

I claim the arrangement of the conducting pipes, W, connecting the pump, B, with the jet pipes, F and K, for the purpose of washing the felt, X, and cylinder, A, with the water which has been separated from the pulp, and thus avoid the necessity of introducing for that purpose water from any other source into the machine, all substantially as described and for the purpose specified.

COUPLING OF THILLS TO VEHICLES—S. T. J. Coleman and J. W. Sibbett, of Cincinnati, Ohio: We claim securing or adjusting the heads, A, in the loops or hooks B, by means of the boxes, C, and bars, D, provided with the screws, E, substantially as and for the purpose set forth.

[T-heads fixed to the shaft are secured in loops attached to the axle by such means that a very secure fastening is obtained, and one that may be readily adjusted, so that the heads will always be kept tight.]

COAL STOVES—J. A Davis, of Syracuse, N. Y.: I do not wish to be understood as claiming the downward draft as that is well known

But I claim the combined arrangement of the shallow fire-box, G, constructed as described, flues, M M and N N, and dampers, D and C, the whole constructed and operating as described.

DISCHARGING CANNON—Josiah Dodge, of Dummerston, Vt.: I claim the double spring hammer, s h, as described in combination with the inclined surfaces, a b c, arranged and operating substantially as and for the purposes set forth.

SMOOTHING PLANES—John F. W. Erdmann, of Philadelphia, Pa.: I am aware that an iron similar to mine is known as a scraper, and that irons have been adjusted in stock with mechanism for changing the cutting (or scraping) angle, and I do not wish therefore to be understood as claiming such features as my invention.

But I claim placing in the throat of the plane back of the iron, the elastic strip, D, substantially as and for the purposes described.

CUTTING SCREWS—Peter Hoffner, of Rising Sun, Ind.: I claim in combination with the die stock, b, the volute or spiral spring, d, arranged and operating substantially as and for the purposes set forth.

OPENING AND CLOSING WINDOW BLINDS—Lucius N. Fay and Wm. Mason, of Warren, Mass.: We are aware that a worm wheel and screw have been used for a similar purpose, but the operation of the screw is rather slow, and if a quick threaded screw is employed considerable power is required to operate it. Our device operates the blind quickly, and not much power is required to operate it, as but little friction is created by the working parts.

We claim operating the blind, A, by means of the worm wheel, F, and flanched plate, I, arranged and applied to the blind and jamb post, substantially as shown, for the purpose specified.

We further claim attaching the worm wheel, F, to the rod, E, which is secured to the lower part of the blind and curved as shown, whereby the gearing or wheel, F, and flanched plate, I, or any other device gearing into wheel, F, may be perfectly protected from the weather and dust, in consequence of the rod, E, passing through the underside of the shell, J, as described.

[This enables swinging blinds or shutters to be operated from the inside without raising the window sash, and provides for retaining them open or closed, or in any intermediate position, as may be desired, for shade or other purposes.]

OPERATING SLATS OF WINDOW BLINDS—Lucius N. Fay and Wm Mason, of Warren, Mass.: We claim the sliding head or knob, B, placed on the guide rod b, which is attached to the cross rail, a, of the blind, the head or knob being connected with the slat rod, d, by the rod, e, the slat rod being braced or supported by a rod, f, attached to a rod, d, and the stile, g, substantially as and for the purpose set forth.

[This device, by the same inventors as the last, is a very perfect fastener for the Venetian or rolling-slat blind. The slats are adjusted in the desired position by simply sliding a knob on the inside of the lower rail of the blind, and cannot be turned by the wind nor by any force applied on the outer side. It removes one great source of annoyance which always attend the use of ordinary rolling slats so soon as they begin to turn easily.]

STEAM BOILERS—Robert Ferguson, of New Orleans, La.: I claim the eccentric arrangement of the water spaces, A A' A", connected with each other, and alternating with the flues of lune cross section, substantially as and for the purpose specified.

CULTIVATOR TEETH—F. R. Forsythe, of Cape Vincent, N. Y.: I claim the new manufacture of cultivator teeth consisting of a sheet steel blade bent to the required form with a cast iron boss cast thereon, substantially as specified.

LET-OFF MOTION OF POWER LOOMS—Wm. H. Gray, of Dover, N. H.: I claim first, The combination of the shaft, P, the endless screw and worm wheel, a and c, or their equivalents, the friction clutch, D E, the arms, d e, attached to the friction clutch, the lever, F, the cams G and I, and the lever, K, the whole arranged, applied and operating substantially as set forth, for the purpose specified.

Second, The combination of the latch, d", attached to the loose portion, E, of the friction clutch, the levers, J and T, operating as described, to detain and liberate the said portion of the clutch, substantially as and for the purpose set forth.

[This is a positive "let off," and maintains an almost perfectly uniform tension on the warp. The amount of let-off motion is regulated by an endless screw and the lever, K, the weighted end of the latter being raised more or less, according as there is more or less yarn upon the beam, D, thus permitting a greater or less movement of the part E of the clutch.]

HARVESTERS—Samuel Gumaer, of Chicago, Ill.: I claim the combination of the blades, m m', with the peculiarly constructed platform, A, and the center swell reel, C, when said parts are arranged to operate in relation to each other, as and for the purpose set forth.

FILE-CUTTING MACHINE—Wm. Halliwell and Levi Osborn, of Poughkeepsie, N. Y.: We claim first, The combined action of the two carriages, B and C, by which the machine is enabled to remove the file that has been cut (from under the chisel) and automatically to replace it by one to be cut.

Secondly, We claim the swivel head for holding the chisel, by which, in connection with the springs, z z, the chisel adjusts itself on the surface of the file.

Thirdly, We claim the levers, cams, and ratchet bar, as described, for holding the file in place.

BOBBINS FOR ROVING AND STUBBING—Isaac Hayden, of Lawrence, Mass.: I claim making that portion of the barrel of the bobbin which receives and takes up the second layer of roving, larger than that part of the barrel which receives and takes up the first layer, substantially as described, to compensate for the thickness of the said first layer, and makes the draft on the roving or stubbing uniform.

SEWING MACHINES—Abial C. Herron, of Remsen, N. Y.: I do not claim a rotating hook which has a longitudinal or transverse motion in the direction of its axis in addition to its rotary motion.

But I claim the hook, h, and roll, t, arranged and operating in combination with the needle, in the manner substantially as described, for the purpose specified.

FACTITIOUS IVORY—Dr. Ludwig Held, of Brooklyn, N. Y.: I do not exactly confine myself to any of the proportions of materials mentioned above nor to any of the gums enumerated; and I do not claim the combining resinous substances or gums with bone or ivory powder, and with metallic oxyds, as has been, to my knowledge, prescribed for plastic compounds resembling ivory.

But I claim the ivory like plastic compound, produced principally by a combination of cartilaginous substance or vegetable fibre with vasic chloride of zinc and gum resins prepared and applied in the manner substantially as described.

SUGAR BOILERS—Peter Holbrook, of Whitingham, Vt.: I claim the steam pan, B, in combination with the sap pan A, and the cover, F, to the syrup pan, E, and the stop cocks, C and D, to the steam pan, B, and sap pan, A, or their equivalents, and arranged substantially in the manner and for the purpose set forth.

PROTECTING THE NECKS OF HORSES FROM FLIES—Ernst L. Kurtry, of New York City: I claim the stretchers, a and e, in combination with the connecting cords, operating substantially as set forth as a fly protection.

I also claim the weighted cords, m and n, connected therewith, for keeping the protector stretched, and at the same time permitting the free movement of the animal's head.

PROJECTILE FOR RIFLED CANNON—T. T. S. Laidley, of U. S. Army: I do not claim, of course, the attachment of a malleable iron tube to a cast iron head, which tube, forming the body of the projectile is expanded by the force of the discharge so as to take the grooves of the rifled gun.

Neither do I claim the attachment to enlongated shot or shells of a cylinder of wrought iron fastened to the body of the shot or shell, by having its bottom or sides more or less imbedded in the cast metal of which the shot may be composed; the cylinder to be attached to the butt of the shot or shell, and its sides projecting beyond

But I claim the attachment to the main body of an elongated projectile, either solid or hollow, of a covering of some malleable material, composed of one or more pieces, embracing the whole or a portion of the exterior surface, by imbedding in the cast metal of the shot, the turned in end, and two or more longitudinal seams or edges, so as to form on the cylindrical surface of the projectile two or more pockets, having a free space between the cast metal of the shot and the malleable covering into which the gases at the moment of discharge entering will force out the covering, and cause it to fill the grooves of the rifled gun, and diminish or entirely cut off the windage of the projectile, whether fired from a rifled or smooth bored cannon, substantially as described.

STOP COCK GAS REGULATOR—O. L. Lawson and A. A. Starr, of New York City: We claim the cock, F, with conical plug, B, on which is cone-shaped groove, f, extending entirely around the same, in combination with the mechanical devices arranged and operating as described, and for the purpose of a portable gas apparatus for vessels, cars, &c.

WINDOW BLIND SLAT HOLDER—Wm. S. Mayo, of New York City: I do not confine myself to the form here indicated. They may be made of many different forms.

But I claim the construction and application to the rods of window blinds of springs or friction pieces of metal to hold the slats in any given position, substantially after the manner and form indicated.

OPERATING WINDOW BLINDS—James McMackin, of New York City: I claim the bar, E, constructed of three pieces, a, b, c, provided with the fastening formed of the slotted plate, f, on the piece, c, and the ledge k, on the piece b, the bar, E, being applied to the blind, A, and fitted within the sill, D, substantially as shown for the purpose set forth.

[Another ingenious device for opening, closing, or fixing in any intermediate position either shutters or swinging blinds, without opening the window.]

KEY—Stuart Perry, of Newport, N. Y.: I claim a bank or store lock key, in which the bits have a movement before, during and after they have arranged the slides or tumblers of the lock which it is to operate upon, so that all trace of the exact point or part of the movement of said key bits, at which such arranging of the slides or tumblers takes place shall be destroyed, and thus prevent any one but the maker of the lock from making a duplicate, substantially as set forth.

CAPSTANS FOR SHIPS—Chas. Perley, of New York City: I do not claim a capstan, windlass and wench combined; neither do I claim a horizontal heaver in itself.

But I claim the combination of the adjustable bearing block, o, with the heaver or windlass, m, so constructed as to receive the strain and weight of chain cable, and relieve the shaft, l, therefrom, leaving said shaft, l, when disconnected from said heaver or windlass free to rotate, and be used for other purposes without loss of power by the friction of said heaver or windlass, even when the vessel is riding at anchor by said heaver, substantially as and for the purposes specified.

I also claim the power capstan, n, and its coupling, q fitted to slide endways of the shaft, l, combined with the heaver or windlass, m, and bearing block O, whereby the said power capstan n, connects the shaft, l, and heaver m, or is itself free for use as a power capstan or bit when connected to or disconnected from said heaver or windlass m, substantially as and for the purposes specified.

FORGING NAILS—S. J. Seely, of New York City, assignor to John M. Hood, of Brooklyn, N. Y.: I do not wish to be understood as limiting myself to the use of the kind of feeder and cutters above described, as equivalent devices and arrangements may be substituted.

Nor do I wish to be understood as limiting my claim of invention to the described special construction of the anvils and hammers, nor to the described arrangement of the mechanism for imparting the motions, as the same results may be obtained by my invention by the substitution of equivalents.

I claim the employment of two anvil faces placed at an angle with each other, and having a rocking motion to bring them alternately in contact with the article to be forged, substantially as described, in combination with the hammers, substantially as and for the purpose described.

HARVESTERS—N. C. Sherman and S. Lightcap, of Hazle Green, Wis.: We claim the combination of the peculiarly formed adjustable collar, H, with the castor frame, f, in the manner described, whereby the castor wheel may be, at the pleasure of the driver, held rigid in line parallel with the driving wheels or released so as to turn in the ordinary manner.

[This provides a means of obviating the side draught when in straight motion without obstructing the turning about of the harvester when the latter motion is desired. The axis of the castor wheel may be set either directly parallel to the axis of the driving wheels or a little oblique thereto, according to the amount of side draught experienced in traveling through the grain. On turning the team, the castor wheel may be set entirely at liberty, so as to turn freely in any direction in which it may be impelled, and thus offer no resistance to the motion.]

PROPELLER BLADE—G. W. Swartz, of Buffalo, N. Y.: I claim a propeller blade constructed in such a manner as to embody said principles, substantially as set forth.

SELF-FEEDING DRILL—G. C. Taft, of Worcester, Mass.: I do not claim placing the drill arbor within the hollow screw, for that arrangement is commonly used for feeding the drill to its work, the screw being turned by hand.

Neither do I claim the means employed for adjusting the head I.

But I claim connecting the screw C, with the crank G, by means of the clamp H, substantially as and for the purpose set forth.

[This invention provides a peculiar friction clamp for feeding the drill automatically to its work in drilling metals. By the use of a friction, clamp the tool is fed with a force readily adjustable by the attendant, and is free to stand and turn without advancing in case of meeting with any too great obstruction, thus avoiding the breaking of any part.].

HARVESTERS—Chas. Tinker and J. A. Sprague, of Mantua, O.: We claim the vibrating arm, K, parallel rod I, and connecting rod T, in combination with the bent levers, X X, fulcrum wheels Y Y, levers Z Z', and stops U U, when the same are arranged to operate in relation to each other, (and used in connection with a self-adjusting cutter and finger bar,) substantially in the manner and for the purpose set forth.

BEVELING STAVES, &c.—John Trahin and Charles Voebel, of New Orleans, La.: We do not claim separately any essential features in the machine described, but merely their specific arrangement, as shown and described for the purposes set forth.

BOOT TREES—Wm. Upfield, of Lancaster, O.: I claim, first, The grooves, G G, cut in wedges, A A, the side-pieces, F F, with inclined planes, S S, substantially in the manner and for the purposes specified.

Second, I claim wedge K, in combination with post I, and wedges A A, or their equivalents, in the manner and for the purposes set forth.

Third, I claim nut H, the right and left screw shaft, D and E, wedges A A, or their equivalents, when arranged, combined and operating substantially in the manner and for the purposes described

Fourth, I claim in this connection sleeve, m, in combination with block B, in the manner and for the purpose specified.

SHOWER BATH APPARATUS—Noah Warlick, of Lafayette, Ala.: I do not claim the distributor or rose drip D, neither do I lay claim to the portability of the apparatus.

But I claim the combination of the double armed bolt c, with the valve V, as described, whereby it is made to perform the double function of securing the valve to its seat, and also of operating said valve, the arrangement being as set forth.

FACTITIOUS IVORY—Wm. M. Willing, of New York City: I claim forming artificial ivory by thoroughly mixing and combining the articles specified, or others, having equivalent properties while under the operation of heat, suostantially as specified.

ELASTIC GORE CLOTH—Charles Winslow, of Lynn, Mass.: I am aware that an elastic cloth has been made as a shirred fabric. This, however, differs essentially from the gore cloth made in accordance with my invention.

I do not claim the peculiar elastic cloth as made with its filling arranged at an acute angle with its warp, nor do I claim the elastic fabric, as made of two layers of such cloth combined,

But I claim an elastic band or gore cloth when made not only of a fabric composed of a cement of india rubber or gutta percha, and two pieces of cloth, in which the warp and weft of each piece are made to cross one another diagonally or at an acute angle, but with the edges of the cloth cut and overlapped in lines parallel or approximately so to the weft, and at acute angles with the warp threads, and cemented down to the fabric as described.

GRINDING KNIVES—Anthony Hauky and Francis Stiles, Jr., (assignors to themselves and F. S. Taylor) of Leicester, Mass.: We claim giving to the knife or other article to be ground or polished, a vibratory motion in a tangent to the plane of motion of the stone or wheel or parallel therewith.

PEDESTAL FOR RAILROAD CARS—D. H. Feger (assignor to himself and Daniel Sheperd) of New York City: I claim the employment of a loose or movable jaw to the pedestal constructed and operating substantially as described and for the purposes set forth

JOINERS' PLANE—T. D. Worrall, of Lowell, Mass.: Having thus fully described my invention, what I claim is, first, The employment of the clamp lever, C, for securing and bedding the bit, in the manner fully set forth and described.

Second, I claim the clamp lever, C, as arranged in combination with T, strap B, and nut F, for the purpose of regulating and adjusting the bit for cutting, when firmly bedded and secured as set forth and described.

CLEANING AND CARDING MOSS—Louis Boudreaux, of Thilbodeaux, La.: It is obvious that my machine may be used for other purposes, such as combing wool carding cotton, and threshing or separating grain from its straw, &c., but I do not claim it for any such purpose.

I claim the combination of the vibrating bed, H, with the bed I, and the teeth arranged as described with relation to the cylinder E, and roller F, operating in the manner set forth.

TAWING AND COLORING SKINS AND FURS—Harmon Hibbard, of Henrietta, N. Y.: I claim the process of compounding either of the above mentioned alkalies with the materials and in the manner as above described, and the process of applying those compounds or either of them to pelts, fur, wool, or hair for tawing or coloring as described.

RE-ISSUES.

WIRE STRENGTHENED SPOONS—Chas. Parker, of Meriden, Conn., assignee of Wm. Mix, of Prospect, Ct. Patented May 1, 1849: I claim, therefore, as my improvement casting the spoon handle in a mold of larger dimension than the finished handles is required to be, as set forth, and subsequently swaging the handles into the proper shape, and condensing the metal upon the strengthening wire by means of the drop press and dies, as described.

DISTRIBUTING APPARATUS OF FLOURING MILLS—A. T. Clark, of Lancaster, Pa. Patented June 30, 1857: I am aware that a single series of spouts has been connected with a bolt, as in the Patent of E. and J. M. Clark, patented June 6, 1854, and I shall not therefore lay any claim to this device, but intend to limit my claim to the double series of spouts and valves, so arranged in connection with the bolt and the open conveyor, A, as to give me facilities for separation and mixing not attainable by a single series.

I claim the double series of spouts and valves arranged and connected with the bolting chamber, substantially as set forth.

I also claim the arrangement of the conveyor, A, in combination with a double series of valves and spouts, as set forth.

DESIGNS.

STATUES OF GEN. WARREN—Henry Dexter, of Cambridge, Mass., assignor to Wm. Carleton, of Charlestown, Mass.

STOVES—J. J. Dudley and Russell Mann, of Troy, N. R., assignors to Geo. W. Eddy, of Waterford, N. Y.

STOVES—S. W. Gibbs, (assignor to Young & Brother) of Albany, N. Y.

COOKING STOVES—Elias Young, of Cincinnati, O.

Counterfeit Trade Marks.

Among not the least of the many evils inflicted by the fashionable rage for foreign goods is the fact that it tends to deceit, and that this deceit, in its turn, finally redounds to injure very unjustly the reputation and sale of American fabrics. The dry goods' correspondent of the Providence *Journal* justly contends that the best specimens of domestic production—specimens which compare with the best foreign importations, and which reflect high credit on American skill and taste, are sold as foreign by retailers, and only the poorer qualities are exhibited as American, so that the excellence of American fabrics goes to enhance the reputation of foreign goods, and to keep down that of our own. This ought to be prevented. It may serve the interests of one season, or of a particular style, to call it French or English, but it is surely against the permanent interests of the manufacturer. The temporary sacrifice which the American producer might make by having his goods sold for what they really are, would be ten-fold repaid by the reputation which they would speedily acquire for themselves. This has been tried in other articles, and with such success as should leave no doubt on the subject. There are American articles that have struggled through the same difficulties, and have reached a position where they stand higher in our own and the foreign markets than the same kind of articles manufactured in Europe. An American manufacturer of edge tools has lately recovered damages in an English court against an English manufacturer who counterfeited his trade mark.—This shows the value which the American producer can give to his articles, and the folly of concealing his reputation under an English name.

But the reform of this evil, as well as of so many others, requires a better organization of our industrial interests. We need this greatly; there are so many things that can be done by associated effort that will benefit each individual, but that no individual can undertake for himself. In England they understand these things better—it is one of the great advantages that they have over us. The manufacturer who produces a superior article should *associate his own name with it*, and that association will, in time, be a capital to him—a capital that will stand by him at the time when he most needs it, and which cannot be taken from him except by his own fault.

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The Laying of the Atlantic Telegraph.

The following from the London *Daily News* gives some information with regard to the precautions which are now being taken on both the *Agamemnon* and *Niagara*, in laying the great telegraph cable:—

The outer coating of the greater part of the cable consists of a coil of eighteen strands of even-thread iron wire, as a protection to the gutta percha core containing the telegraph wires, from friction or other injury until it has been safely deposited on the bed of the deep Atlantic. But those portions of the cable which will have to be joined when the vessels part company may possibly be subjected to an extra strain as the first unbroken link of it sinks between the sterns of the two vessels to find its ultimate resting place; and to meet this possible contingency, ten miles' length of this central portion of the cable has been protected with a sheath of 18 steel, (instead of iron) wires, and is supposed to be capable of sustaining a strain of twelve tuns. The machinery made by Messrs. De Bergue and Co. includes paying-out sheaves or drums of five feet in diameter, having grooves corresponding to the thickness of the cable, with a friction drum attached to them revolving three times as fast as they do, and with breakage power to check or retard the motion of the sheaves at pleasure. From the hold of each ship the cable, passing over four of these sheaves to a few feet above the poop deck, will be dropped into the sea over a fifth sheave, placed above the stern. The exact amount of strain will be constantly indicated by an instrument for the purpose under the eye of the breaksman. At the sides of the vessel will hang down into the water new electrical logs, principally due to the ingenuity of Mr. Charles Bright, the Atlantic Company's chief engineer. These immersed logs have vanes and wheels revolving at a rate proportioned to the passage of the ship through the water, and making an electric circuit which is broken at each revolution. An electric wire, from the log to the deck, records there every revolution of the log, and consequently the exact speed of the ship. It must not be supposed when the ships part company that communication will be lost between those on board the vessels. The electricians have hold of either extremity of the coils of the cable, and will interchange signals constantly, so that each vessel will be aware of the other's fate, and of every incident that may help or retard the progress of submersion, unless some unfortunate emergency should snap the link. When the topmasts of the ships have sunk beneath the horizon, and they are lost to view by the look-out-men, the inter-oceanic current of electricity will give instant record of all that passes, until the lengthening line of cable has been spun out from shore to shore. A bell on board each vessel will sound every second, as each portion of the cable is paid out; and its silence will probably be the first indication of any mishap arising from friction or over-tension of the cable. The vessels will have apparatus on board, so that in any such emergencies they can be backed, the cable recoiled until the faulty place is found, when a piece will be cut out and the perfect portions re-united with as little delay as possible. In case of a storm, apparatus has been provided to allow for any extraordinary strain that may occur, and, if necessary, for cutting the cable without letting the outer end of it slip to the bottom of the ocean, whence it might never be recovered. In such an emergency there are large reels of auxiliary cable of great strength, which could be attached to the end; and these auxiliary cables can be suspended from huge float-shaped buoys on the surface of the water, capable of resisting a very considerable strain till all danger has passed.

Changes in the Size of Vessels.

Thirty years ago, remarks a late writer in the Boston *Traveler*, there were very few merchant ships of one thousand tuns register, except the ships of the East India Company. These were magnificent vessels, of about 1,500 tuns, organized in their discipline somewhat by the rules of the Navy. They were very strongly built, of the best materials, mounted guns upon two decks, and carried crews of one hundred and fifty men, but being full modeled, were not fleet sailers. After the East India Company's mercantile monopoly expired, other vessels, varying from 700 to 1,000 tuns, termed "free traders," took their place in the trade of the East. But as the rates of freight diminished, British shipowners increased the size of their vessels, arguing correctly that a ship of 2,000 tuns could be built and sailed at less cost than two vessels of 1,000 tuns each, and consequently could better afford to take cargoes at the reduced rates of freight.

The enormous expense of building ships in England, induced ship-owners to turn their attention to British North America, where vessels could be built at half the cost required in England, and a competition arose which was the origin of cheap shipping, both here and in England. The great size, and cheap materials and fastenings of American vessels enabled our ship-owners to compete successfully, for a long time, with English vessels, both at home and abroad.

When the California trade opened, ships, such as the world had never seen before, were produced. Their vast size—many of them over 2,000 tuns register—their beauty and matchless speed, gave them the monopoly of the trade, West and East. The English shipowners were alarmed, and purchased many of our best ships and modeled after them, but built their vessels smaller than those they purchased. Trade became dull, and vessels of moderate capacity with good sailing qualities, obtained freights, while their larger rivals, owing to the time required to load them, remained idle. Our ship-owners generally have now ceased building very large vessels. Vessels of 700 tuns are better adapted to the state of trade than those of larger capacity.

The days of extreme clippers are numbered. When, adds the same writer, those beautiful vessels which were built for the California trade have passed away, their places will probably never be supplied by others like them. Any man who should now propose to build an extreme clipper, would be considered insane.

Although the ships which are now being built are of nearly the same class as those which were built ten years ago, yet the various changes of the past have been productive of many improvements in modeling, construction, rigging and equipments.

Natural Bridges.

When a great body of water has accumulated in a lake until it overflows its barriers, the dam, if narrow and soft, is rapidly washed away, and the subsequent traveler finds but a quiet river flowing through a "notch" in a chain of mountains. Effects somewhat analogous are produced by the flowing of quiet rivers through a soft alluvial country of uniform level, where, as is the case with much of the country in the Rocky Mountain region, the streams are sunk several hundred feet below the level of the general surface. But when, in either configuration of country, the upper surface is of a harder material than the base, it is possible for the water to force a passage beneath, and leave the rocks above. There have doubtless been great numbers of such temporarily formed, and small ones exist at this day without attracting particular attention. The one over Cedar Creek, in Virginia, which is described in all the geographies, as quite a place of resort, is of great hight, and is made available as a means of carrying one of the common roads of the country across the stream; but it seems destined to lose its laurels, in consequence of the attention which, by a recent survey for a railroad, has been attracted to another, which is both higher and wider and also used in the same way.

The Abingdon *Virginian* describes Natural Bridge No. 2, which lies in Scott county, that State, as one compared with which the bridge over Cedar Creek is a mere trifle. The Scott bridge extends across a chasm more than twice 80 feet in width, and is 420 feet deep. We think this is higher than any artificial bridge in the world, if we except the ancient aqueduct of Spoletto in Italy, which is the same hight. At the bottom of this gulf flows a larger and more rapid stream than Cedar Creek. The arch of the Scott bridge, the *Virginian* remarks, is not so perfectly formed as that of Cedar Creek, but is not less a bridge, with a broad wagon road located upon it. A recent survey for the Cumberland Gap Railroad passed through the arch of this bridge, and thus brought it into notice. It is described as the wildest and most stupendous curiosity in the United States, and yet it is comparatively unknown.

Live Fences—Osage Orange.

In the August number of the Wisconsin *Farmer*, its editor affirms that his faith in the Osage orange as a shrub suitable for hedges in a tolerably cold climate has been fully dissipated by the last few years observation and experience. For almost two years he has constantly, but unsuccessfully, inquired for the first person who was meeting with any substantial success in the growth of the Osage orange, north of Chicago. Hence he concludes that the thousands of experiments that he knows have been tried, must generally, if not invariably, have proved failures. He believes that this long cherished article must be abandoned throughout the whole of the great and fertile Northwest, and that people must look about them for something better, or abandon the whole subject of live fences, and make up their minds to fully rely upon dead timber, a material which must long, if not always, be very scarce in many localities, and at best expensive and transient in duration. But he recommends a thorough trial of numbers of our more northern shrubs, and fast growing trees. Observant men throughout the Northwest who have opportunity, taste and leisure, should institute a series of experiments with the native thorns, and dwarf or crab-apple trees or wild plum, with the honey locust, or whatever else in their judgment promises best, not forgetting the hawthorn, both American and English, to which we invited attention a few weeks since. Let the State and county agricultural societies offer adequate premiums for actual success in these important experiments.

A course of this kind pursued steadfastly and thoroughly by one hundred experimentalists for four consecutive years, would probably result in triumphant success with more than one of the shrubs mentioned. The object is well worthy of a trial in an earnest manner.

The editor of the American *Agriculturist*, in recent travels West, paid particular attion to this shrub, and reports that of forty-seven hedges examined, twenty-three were badly injured by frost, seven were considerably injured, and four slightly so. Of the thirteen uninjured, seven were sheltered by hillsides, groves, or by snow banks produced by adjacent fences. This looks rather unfavorable to its general use.

Indian Corn.

Maize, or Indian Corn, originated in America, and is not yet, we think, cultivated to any extent on the European continent. Though the people of Great Britain cannot be made to appreciate its merits very fully, the aggregate exports of corn in 1856, in the form of whole grain, meal, corn starch, farina, etc., amounted to between seven and eight million dollars, or about one-fortieth of the whole exports of the country, and 6,700,000 bushels, considerably more than half, went to England alone.

Corn has always been an important article in this country, both of consumption and export. The total amount of this produce exported in 1770 was 578,349 bushels; in 1791, 2,064,936 bushels, of which 351,695 were Indian meal. The value of corn and its manufactures exported from the United States in 1830, was $597,119; in 1835, $1,217,665; in 1840, $1,043.516; in 1845, $1,053,293; in 1850, $4,652,804. The export increases more rapidly than the production. The export of corn quadrupled between 1840 and 1850, while the production did not quite double.

The great amount of invention bestowed on corn planters, corn cutters, shellers, cob grinders, etc., tends each year to promote the increase of production. It has been estimated that, as a general rule, seven pounds of corn will produce one pound of pork; so that in localities where through distance from market or from transportation facilities, the cereal cannot be raised at a profit for sale, it is frequently the material used in fattening the more concentrated form of diet, and on which, consequently, the freight is less. Cob meal we believe, is most valuable for animals that chew the cud; horses and hogs, as a general thing, deriving less benefit from the cob-grinding inventions. With all animals, however, we believe, there is a perceptible advantage realized by mixing the cob with the denser meal.

Concentrated Milk.

Gail Borden Jr's patent process for concentrating and preserving milk has recently been put in successful operation in Burrville, Litchfield Co., Conn., and milk reduced to about two ninths its original volume is now sold in our city at about 32 cents per quart. It is becoming quite popular on steamships, and may be recommended to all who are sensitive on the subject of swill-fed milk in cities. Its taste is that of ordinary scalded milk, and the process of preparation consists in keeping it from the air and concentrating it as rapidly as possible by boiling *in vacuo* at a temperature of less than 130° Fah. In using it, water is simply poured in until the fluid is restored to its former condition. From personal experience we can recommend it as a better article for family use than most of the milk sold in this country, and equal to the best. Under ordinary conditions this milk will keep a little longer than common milk, but there are two ways in which it can be preserved for months and probably for years. It may be hermetically sealed in cans, or may be combined in due proportion with pulverized sugar, the sugar being less than required by ordinary tastes as sweetening for tea or coffee. A third method, that of surrounding it with ice, will preserve it for several weeks. There is a prejudice against *manufactured* milk, but this article is simply pure country milk recuced in bulk by the loss of some 75 or 80 per cent of its water. We can vouch for the integrity of Mr. Borden, having known him for many years.

Arctic Explorations this Season.

A few weeks ago, in treating on the subject of Explorations in the Arctic Regions, we alluded to the fact that a small expedition, one vessel only, had sailed this season from England, to give a final search for traces of Sir John Franklin; but we inadvertently neglected to notice the intended expedition of Dr. Rae from Canada, to define the yet undetermined points on the northern coast of our continent. The name of the vessel intended for this duty is the *Iceberg*, a brigantine of about 100 tuns. She was launched a few weeks since at Montreal, nearly ready for sea. The season being too far advanced to enter upon her proper mission, we learn that she will be engaged in freighting till Fall when Dr. Rae will take her to England, and be prepared next spring to carry her into the Polar Sea.

The Tehuantepec Route.

Late accounts from Tehuantepec announce that the road across this isthmus is rapidly progressing. Col. Summers and party, from New Orleans, had arrived with saw mills and a pile-driver, and were actively engaged in driving piles, and laying the foundations of the bridges. When the pile-driver was put in operation it created quite an excitement among the natives, they never having seen anything of the kind. The greater portion of the timber for the bridges is already cut and on the road, ready for use. The road, having paid all previous claims, is out of debt, and the friends of the enterprise may look for its early completion. The contractors can command any amount of native labor at thirty-seven cents per day.

The new Houses of Parliament in London have been in progress nearly twenty years. They cover more than eight acres of ground, and contain 1,180 rooms, 10 halls, 126 staircases, and more than two miles of corridors, passages, &c.

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New Inventions.

Self-Lifting Harvester.

The cut below represents a recent improvement in Harvesters, to facilitate the raising and lowering of the front. Fig. 1 is a vertical longitudinal section, and Fig. 2 a vertical cross section. The power is derived from the motion of the machine itself. A is a part of the main frame, resting and turning on the main shaft S, and attached by a flexible joint to the tongue B, to the upper side of which latter a rigid arm B′ is attached, extending back over the main frame A between the standards C C. The standards C C support a pulley, D, over which passes a chain or cord E attached at one end to the rigid arm B′, and at the other to a clutch pulley on the shaft S. A piston, G, mounted in a cylinder

Fig. 1

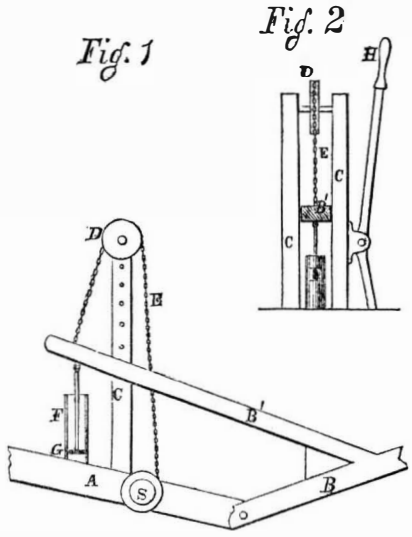


Fig. 2

F, is attached to the under side of the arm B′ by a flexible joint or hinge and is provided with a valve on its lower side, said valve opening downwards. H is a clutch lever suspended by a suitable joint from standards C C.

The operation is as follows: The driver when he sees an obstacle in the way of the machine takes hold of the handle of the clutch lever H and moves it toward C C, by which means the clutch on the shaft below is thrown into gear and the chain E rapidly wound around the clutch pulley, while the arm B and piston G are as rapidly elevated as well as the front of the machine, until the arm B′ comes in contact with a projection on the clutch lever, not represented, and forces it out of gear. The machine is now prevented from falling suddenly back to its former position in consequence of the resistance of air against the piston G in the cylinder F, but as it is not designed to have the piston quite air tight it will gradually return to its former position. The cylinder, F, is however, provided with a valve, not represented, so that the driver by a slight movement of his foot can open the same at will, when the machine will return very rapidly to its normal condition. The machine can be retained at any desired height by means of a pin inserted below the arm, B′, in either of the holes in the standard, C C. The clutch can be arranged to be operated on by the driver's feet, if desired.

Automatic Fan.

Within a few years it has become quite common, in establishments where power is available, to promote the comfort of the inmates during the heat of summer by working large reciprocating fans. We have seen among the smoke and heat of a forge, huge fans made of stout boards, but with margin leathers at the lower edges to reduce the number and soften the effect of accidents due to collisions therewith; and in several hotels and eating houses in this and other cities, steam power has been made available in giving motion to lighter and more gracefully designed apparatus for a similar purpose. The office of the New York *Sun*, beneath where we are writing, is at this moment cooled by the same means. The invention represented in the accompanying engraving is intended to produce a somewhat similar effect but on a smaller scale and by the consumption of far less power It is, in brief, a fan worked by clock-work, which latter may be actuated by a weight or spring at pleasure. It is particularly intended for sick rooms and sleeping apartments, and is of sufficient power to materially diminish the discomfort attending calm, hot weather. The chief novelty is in its great portability. Figs. 1 & 2 represent different forms of the device, but like letters represent substantially similar parts in both. A is a circular track or fixed flooring mounted on short legs as represented, B a platform capable of revolving on small wheels or castors, C represents one or more uprights or supports, D a slight shaft or rocking spindle,

REBSTOCK AND REIMEL'S AUTOMATIC FAN.

Fig. 1

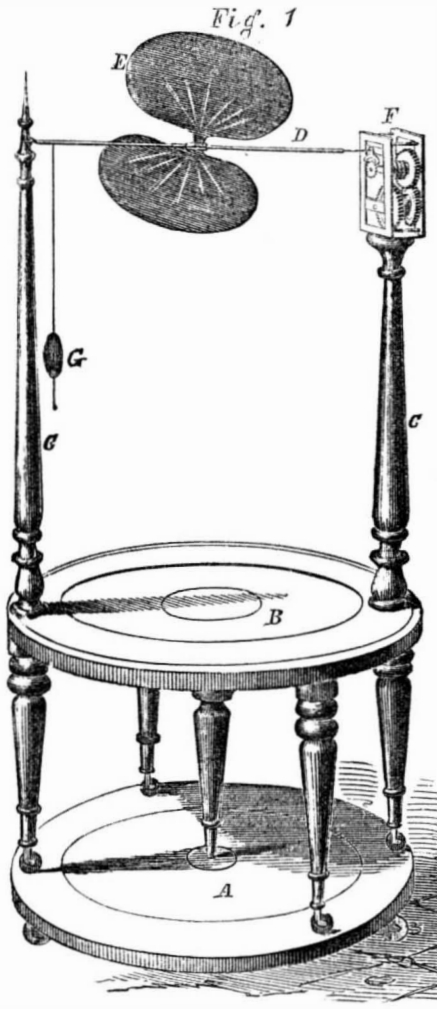
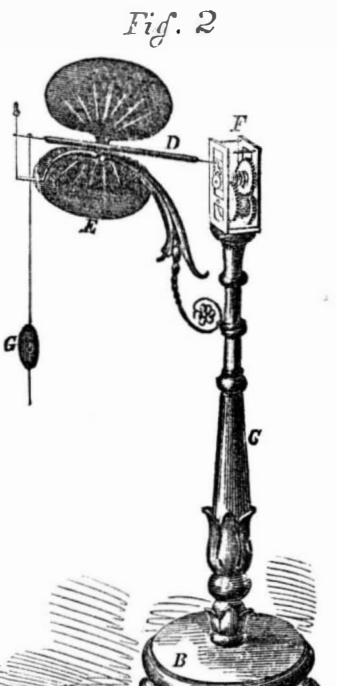


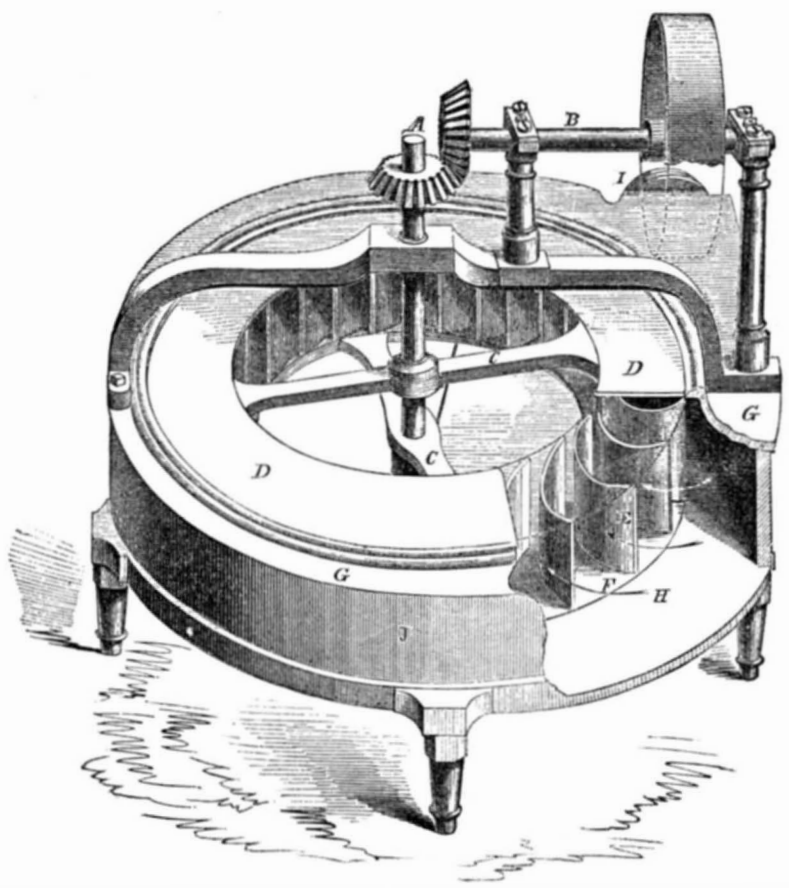
Fig. 2



E E two broad thin wings of paper or other suitable material, F strong clock-work, and G a pendulum fixed on D. The effect of the clock-work is to give an active reciprocating motion to D and consequently to both E E and G. The motion agitates the air and produces the effect desired. By turning the platform, B, by the hand, the air is discharged in any direction at will.

This device was patented June 9, 1857. For further information address the inventors and patentees, L. Rebstock & N. Reimel, Jr., No. 6 Myers Court, Race, below Sixth street, Philadelphia, Pa.

GOODWIN'S CENTER VENT WATER WHEEL.



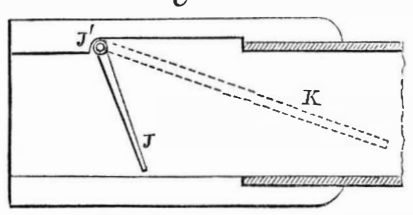
The accompanying figures represent a simple and improved water wheel, invented by L. D. Goodwin, of Peruville, Tompkins co., this State, and secured by Letters Patent on the 4th of April, 1854. The wheel is already very popular, and has been more or less introduced over a very large extent of country in the South and West.

The wheel may be considered one of the forms of turbine. The water is received in a scroll surrounding the wheel on the exterior, and is discharged through narrow apertures between the buckets on the interior, from whence it escapes freely, both upward and downward, provided the wheel be, as is generally preferred, deeply immersed in back water.

Fig. 1 is a perspective view of the wheel and scroll, with a portion of the latter broken away. Fig. 2 represents a self-regulating device which is mounted at the point where the water is admitted.

A is the shaft, mounted in a suitable step at the base, and connected in any ordinary manner to the jack shaft, B, from which motion is transmitted to the mill work. C C are simple cross bars or radial arms, which may be more or less in number, and which serve simply to connect the exterior rim, or the efficient portion of the wheel, to the central shaft. D is an annular upper plate, and F a corresponding lower plate. E represents curved buckets, the curve of which is peculiar, and to which is due the increased efficiency of the wheel. The plates are made of boiler iron, or thin sheets of steel, sharpened at the outer and exterior edges, and bent in a form which cannot be perfectly represented in a perspective drawing, but may be described as being a perfect sweep, or arc of a circle throughout

Fig. 2



the greater portion, but perfectly straight or plane for a short space near the inner edge. The blades are so placed that the curve at the extreme outer edge coincides with the periphery of the wheel, so that the water is received smoothly, or without shock, and is induced to travel along the curved surface of the blade, and be discharged at the inner edge in a quiet state, or without agitation. G represents the upper, H the lower side, and J the exterior of the scroll which conducts the water from the induction passage, I. The wheel is geared to travel with about two-thirds the velocity due to the natural motion of the water, and when all is in proper proportion, the water is discharged backwards from the buckets with precisely the same velocity relatively to the wheel, as the wheel itself moves at that point. In other words, the water is discharged backward from the wheel with such velocity as to be left without motion. This wheel is claimed to utilize—or absorb in giving motion to the wheel—as large a per-centage of the whole effect as most of the best arranged overshot or turbines, and, in addition to this quality, to possess a self-regulating property not yet referred to.

Within the part leading to the fore-bay there is a balance regulator gate, J, shown in detail in Fig. 2. It is hinged to the top at J′, where a shaft runs through the side to which the lever, K, is affixed, that serves to to move the gate. This gate, J, opens (with the current through it) in the direction of the current, and when opened to the proper point for the labor required, is held in that position by a proper weight upon the lever, K, which acts to close the gate, and if any labor is removed from the wheel, or more is added, the gate rises and falls by the action of the current thereon, to admit more or less water, as required, rendering it a perfectly self-regulating apparatus, which by practice is found to be very perfect and immediate in its action, so that the effect of the self-adjusting gate is to produce a tolerable uniformity of motion without a governor, however various the labor may be applied.

Orders for these wheels may be addressed to I. W. Dwight, Dryden, N. Y., or to E. C. Bramhall, 190 Fulton st., New York.

Testing of Steam Engines.

The Managers of the American Institute propose to test steam engines practically, at the ensuing Fair, with regard to economy regularity, and small first cost. It is a good idea. See Advertisement.

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Scientific American.

NEW YORK, AUGUST 15, 1857.

To Readers of the Scientific American.—Our New Volume.

The fleeting wings of Time have carried us almost to the end of another twelve months' journey, and we are brought near to the beginning of a fresh professional campaign. In three short weeks we shall close the printed records of our twelfth year, and open the unsullied pages of the thirteenth.

The major portion of all subscriptions to the SCIENTIFIC AMERICAN will expire with the current volume. It is, therefore, necessary that all of our friends who desire to continue the paper should immediately remit, in advance, payment for the new year. "Pay the printer" is an old and wise maxim. We trust it will not be forgotten at the present time; for our invariable rule is to cross from our books the name of every subscriber when his term expires, as we have no disposition to thrust our paper upon those who may not wish to continue it, although we regret the loss of a single name. We intend to begin the New Volume on September 12th next, with an edition sufficiently large to supply an increased subscription list. Early remittances will prevent the loss of any of the first numbers of the volume, for which there is always an unusual demand. Our terms are set forth in the Prospectus on the last page. It will be observed that for all clubs of twenty and over, the yearly subscription is only $1 40.

Several new arrangements and improvements are proposed by us for the new volume, which, we doubt not, will give satisfaction to our many kind patrons. In the first place, new type and other typographical accompaniments, have been provided, which will considerably beautify the appearance of our publication. In the next place, we shall endeavor, by every means in our power, to improve the general contents of the SCIENTIFIC AMERICAN, and render it increasingly useful and attractive to every reader. Lastly, we propose to reward liberally all who will volunteer to assist in the good work of increasing our subscription list. For this purpose we have set aside, in cash, the sum of *one thousand five hundred dollars*, to be paid in the form of premiums, to those who are disposed to co-operate with us. Whoever labors for us will thus be well repaid. We will pay in cash for the fifteen largest lists of subscribers sent in to us between now and the 1st of January 1858, the following sums:—

For the largest List,	**$300**
For the 2nd largest List,	**250**
For the 3rd largest List,	**200**
For the 4th largest List.	**150**
For the 5th largest List,	**100**
For the 6th largest List,	**90**
For the 7th largest List,	**80**
For the 8th largest List,	**70**
For the 9th largest List,	**60**
For the 10th largest List.	**50**
For the 11th largest List,	**40**
For the 12th largest List,	**35**
For the 13th largest List,	**30**
For the 14th largest List,	**25**
For the 15th largest List,	**20**
Total,	**$1500.**

Names can be sent in at different times, and if desired, the papers addressed to different Post Offices. The cash will be paid to the orders of the successful competitors immediately after the 1st of January, 1858.

In view of the above, we hope that our friends will be induced to take hold and see what they can do in the formation of subscription lists for the SCIENTIFIC AMERICAN. The practically useful character of our paper, and the welcome reception it meets wherever it goes, render the enterprise of procuring subscribers' names comparatively easy.

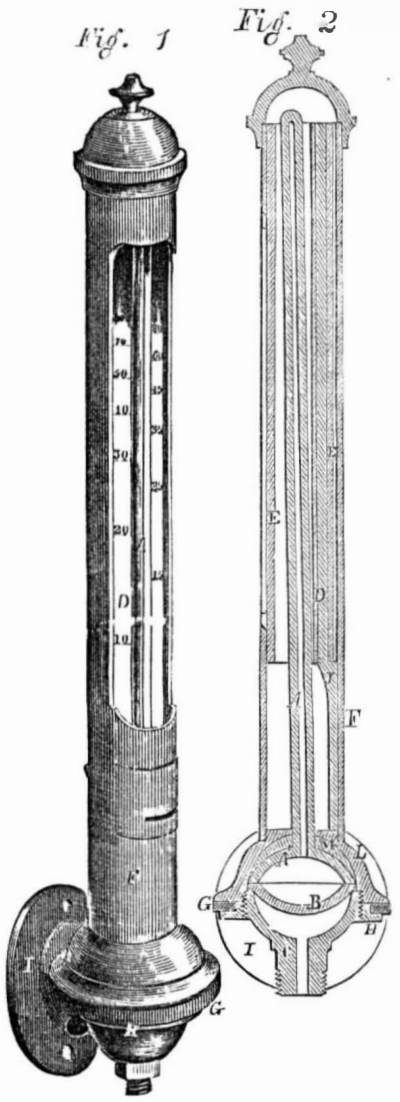
The opening of a new volume presents an excellent opportunity for new subscribers to enroll their names. We want an increase of at least *ten thousand names* for the year 1858. Shall our want be met? It remains with you, friends, to say. We leave ourselves in your hands.

Miller and Kailey's Steam Gage.

The accompanying figures represent an improved Pressure Gage or manometer, patented by Joseph H. Miller and John Kailey, of Canton, Ohio, on the 16th of June last. It is a mercury gage, and one of the forms thereof in which the fluid is forced to rise against the pressure of enclosed air, so that the range is moderate, and the gage in every respect equal to the most portable and convenient gages of this character now in use. The peculiarity consists in the mounting and arranging of the lower portion, and in the protection of the whole against injury, also against derangement in consequence of being placed in inclined positions, agitated, or the like.

Fig. 1 is a perspective view of the gage complete, and Fig. 2 a section through the whole.

A is the glass tube, and A a bell-shaped mouth at its lower extremity, B is a diaphragm of properly prepared rubber, C a cup-shaped bottom of metal, D an index plate carrying



the suitable graduations, E is a glass case which forms a protection for the enclosed tube, and F a brass case, open on one side as shown in Fig. 1, which serves as an additional protection to the whole. G is a supporting ring, on which the weight of the whole is carried, H a tightening ring, which is screwed up against G, to attach the gage firmly to the latter, and I a broad flange, by which the whole is fixed either to the boiler or to any suitable fixture. J is a piece of wood, which forms a support for the index plate, D. L is a top piece, and M is a filling of plaster, to secure a tight fit of L to A' The connection at the bottom leads to the boiler, and allows the steam to press directly against the diaphragm, B, which is here represented as being slightly depressed, or bent downwards by the weight of the mercury. As the pressure of the steam increases, it forces this diaphragm to assume, first a plane, and finally, an upward bulged condition, the surface of the mercury in the tube, A, of course, rising to a far greater extent, and indicating the pressure very accurately.

It will be seen that this gage is perfectly safe against all possibility of derangement, except from the cracking or stiffening of the diaphragm, B, an effect which cannot be avoided in any gage of this character, but which, with prepared material, will not occur for a long period. It will also be seen that no steam or water comes in contact with the glass, and consequently the latter cannot be affected either by violent changes of temperature or by the expansion due to the freezing of any water which might be retained. The gage may be mounted so as to allow the steam to come directly into contact with the diaphragm, B, or the pipe may be bent so as to allow the collection of water in a portion of the connecting pipe, so that the pressure will always be transmitted through a cool medium.

For further information, or for the purchase of gages, or rights to manufacture, address Messrs. Miller, Kailey & Danner, as above.

Conveyance of Power.

Shafting and belting, the means in most common use for transmitting power from one point to another, are far from being the only agencies available for such a purpose. At the top of the banks of the Niagara river, a little below the Falls, on the American side, a large reciprocating saw is (or was a few years ago) driven by the action of a water wheel in the rapids some 200 feet perpendicular depth below, and without anything equivalent in its action to either shafting or a belt. The connection was formed by pitmans, or connecting rods, of wire rope. There were four cranks on the jack-shaft near the water's edge, and an equal number of a similar throw in the mill above, and each was connected with the corresponding one by a rope steadied at two or more intermediate points. The action of the wheel was expended in turning the lower shaft referred to, and the connections described compelled the upper one to revolve in the same manner.

Power is sometimes required in mines where the smoke and gases evolved by a fire for a steam boiler would be a very serious evil. Steam could be conveyed to an engine within a mine from a boiler above ground but not without a great loss from condensation. At the great London Exhibition of 1851 the steam was generated in a separate boiler house, and conveyed under ground to the "machinery in motion" department, the east end of which must have been at least a sixth of a mile from the engine house. The conveying pipes were wrapped thickly with hair cloth, over which was placed a covering of patent canvas. This is probably a greater distance than high pressure steam was ever carried in any other instance, but the steam for the engines in the New York Crystal Palace, in 1853, was generated on the opposite side of the street, and conveyed in a pipe encased in a continuous box of saw-dust extending the whole distance, some 250 feet, we think, without much loss; and in Western steamboats, with stern wheels, the steam is usually carried from boilers near the bow almost to the extreme stern in naked pipes, all of which instances may with propriety be termed "conveyance of power," as the power is obviously treasured up in the steam ready for development in the cylinder of the engine. At the Govan colliery, near Glasgow, Scotland, an engine has been several years at work at a point half a mile from the mouth of the pit, by the force of air pumped into it by the aid of a steam engine above. We gave an extended notice of this apparatus soon after it was successfully put in operation, and it has recently been described in a great number of mechanical journals. The duties of this engine—the cylinder of which is ten inches in diameter with a stroke of piston eighteen inches—are to raise water and ore from a still lower pit. For the performance of a smaller amount of work—the drawing of trains of wagons along a level—another British colliery has, we learn, recently introduced a stationary engine in the mine, and adopted a somewhat similar means of conveying the power, but using water instead of air. The engine consists of two small cylinders and pistons, each being three inches in diameter, with a 12-inch stroke. The water which supplies the power is that pumped from the shaft, collected in a reservoir six hundred and six feet above the level of the water engine, and of course applying an enormous force on the pistons; the pipe conveying the water down the shaft is four and a half inches in diameter.

The question, which is the best method of conveying power in any given instance, must depend much on the circumstances. We have given these examples to show how some apparently very serious difficulties have in several instances been surmounted.

Testimonial to Judge Mason.

"UNITED STATES PATENT OFFICE.
August 1st, 1857.

"SIR:—We, the undersigned, offer you the expression of our regret that you have resigned the position which you have so long held as the head of this office.

"In the relation which has existed between us, you have uniformly shown a courtesy and dignity alike pleasing and impressive; and we assure you that we shall always retain a grateful recollection of your personal kindness and a high respect for your official ability.

"Permit us also, collectively and individually, to tender you our most sincere wishes that, in all the relations of life, your future may be one of unclouded happiness."

(Signed by all the officers in the Patent Office.)

"To the HON. CHARLES MASON,
late COMMISSIONER OF PATENTS."

Judge Mason, in reply to the above letter of kind expression and good wishes from those employed in the Patent Office, says:—

"UNITED STATES PATENT OFFICE,
August 3d, 1857.

"Gentlemen:—Your communication of the 1st inst., manifesting regret at our approaching separation, and filled with kind expressions relative to the past, and good wishes for the future, has afforded me the liveliest gratification. It will be treasured and remembered with pride and pleasure throughout the course of my future life.

"That during the four years I have been connected with this office, I have not given frequent occasion for dissatisfaction, as well to employes in the office, as to those doing business therewith, I cannot for a moment suppose. But I have met in all directions, and in almost every instance, with evidences of an indulgent charity greater than I had any reason to expect, or any right to claim. It is evident that freedom from error has not been expected, and that correctness of intention has often been received as its substitute by those within and without the office.

"It is now a source of unalloyed satisfaction in reviewing the past, to reflect that, as far as my knowledge and recollection extend, nothing like an angry feeling has been excited in my official or personal intercourse, either with the multitude of anxious, interested inventors, or with those with whom my relations have been more frequent and intimate in the daily transactions of business.

"It is this consideration which has given the principal charm to the position in which I have been placed for the past four years, and has more than once induced me to postpone a severance of those relations which were so agreeable, although very strong considerations were urging me to that severance. This force has recently been augmented to such an extent that I feel it to be controlling; and I find myself compelled, with many and deep regrets, to bid you all adieu.

"All your kind expressions and good wishes are most cordially reciprocated. I hope I may long find a place in your friendly recollection; and I shall never cease to regard with interest the fortunes which in future await you all.

"I trust we may often meet hereafter; either here or in my Western home, where I shall always be happy to welcome you.

"I remain, very truly, yours, &c.,
CHAS. MASON

S. T. Shugert, Esq., Chief Clerk, will act as Commissioner of Patents until a successor can be appointed. Mr. Shugert has had much experience in the office, and will no doubt supervise its business with discriminating care.

We are assured that the President will not hastily fill this important office, and Madam Rumor intimates that the choice may ultimately fall upon some one of the worthy officers now connected with it. We should have no objection to such an appointment if carefully bestowed, so that it would indicate a proper regard for the interests of inventors.

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Extraordinary Performance of a Turbine.

A paragraph, headed "Philosophy in Court," has been going the rounds of the papers for nearly a month, claiming for a turbine water wheel constructed by Uriah A. Boyden, of Boston, the realizing or utilizing 96 per cent of the whole power of the water.

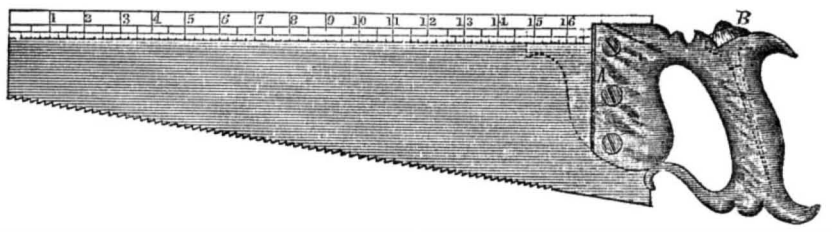
The labor involved," it remarks, " in this result may be imagined from the fact that Mr. Boyden spent more than $5,000 in the mere mathematical calculations." The wheel, it alleged, was constructed for, and is now running in, the Atlantic City Mills, of Lawrence, Mass. The pay was to depend on the econ my of the wheel, and the 96 per cent is alleges in the paragraph to have been the decision of the scientific parties to whom the matter was referred. The case is one about which more or less has been said in engineering circles for four or five years, and it is important that it should go on record correctly.

In 1846, Mr. Boyden, known as a very successful designer of Fourneyron turbines, entered into a contract with the Atlantic Cotton Mills at Lawrence, Mass., by which he undertook to convey to them his patent rights for important improvements in turbines for a sufficient number and size to use a specified amount of water, and to furnish designs and superintend the construction of the same. The Corporation was to pay the expense of measuring the water used by, and the power derived from, the turbines, and if the power obtained was seventy-six per cent of the power of the water expended, two thousand dollars was to be paid, and for every one per cent above seventy-six, a further sum of three hundred and fifty dollars. Misunderstandings arose between Mr. Boyden and the officers of the Corporation, and it was not until the summer of 1851 that one of the turbines was tested. The apparatus for testing consisted of a friction pulley and brake, constituting a Prony Dynamometer for measuring the power furnished by the turbine, and of a weir to guage the quantity of water expended. The principal difficulty lay, in computing the flow over the weir, or, in other words, in measuring the quantity of water used. In the absence of positive proof, the parties were not able to agree upon a formula for computing this, and, of course, could not agree as to the per centage of useful effect furnished by the turbine on which depended by Mr. Boyden's compensation. The contract provided that each of the turbines should be tested, but the Atlantic Cotton Mills found that to test more than one would subject them to great inconvenience, if not loss, and declined testing more than one. Mr. Boyden, however, insisted on his rights under the contract. The natural result of this state of things was a suit at law, brought by Boyden against the Corporation, in the Supreme Court of Massachusetts. The case came on for trial in Boston, in January, 1856, but very little progress had been made, before the Judge came to the conclusion, which he stated emphatically, that a board of competent referees would be a more suitable tribunal than a judge and jury. A reference was accordingly agreed to by the parties, the referees being Joel Parker, Professor of Law in Cambridge University; Benjamin Peirce, Professor of Astronomy and Mathematics in the same institution, and James B. Francis, the experienced hydraulic engineer, of Lowell. Eminent counsel were employed by both parties, and a most thorough investigation was had before the referees. It was claimed for Boyden that the turbine tested gave 96 per cent; this was attempted to be proved by the experiments, and also by a prodigious mass of calculations based upon very profound mathematical principals, by which, from the form, dimensions and motion of the turbine, it was attempted to ascertain exactly the quantity of water discharged. These calculations were made by Mr. Boyden and his assistants, at a cost to him of over $5,000, which it was claimed should be re-imbursed to him by the Corporation. His whole claim was about eighteen thousand dollars, besides damages for breach of contract.

On the part of the company it was contended that the per-centage did not exceed 88 1-2 per cent, that being the result obtained by their engineer, who used the formula most suitable according to his views, for computing the flow over the weir; they objected also, on several grounds, to paying the $5 000 for the calculations, and also to paying damages for breach of contract.

The referees awarded Boyden about $16,600 and costs of court and reference, but made no award as to the per centage furnished by the turbine. The actual economy of the wheel—undoubtedly *one* of the best, and probably the very best, adapted to its work of any ever constructed—will therefore always remain an open question, the maker claiming 96 and the user acknowledging 88 1-2 per cent.

GORHAM'S MEASURING SAW.



The engraving represents very distinctly a simple yet obviously important improvement in hand-saws, which enables one tool to perform the functions of a saw and square with tolerable exactness. The blade of the saw is perfectly straight on the back, and the front edge of handle A is made perfectly straight, faced with metal to prevent becoming bruised or incorrect with use, and is finished up after being fixed to the saw, so as to be exactly at right angles to the back of the blade. The blade is graduated, as represented, so that it may be used to measure, and scratch-awl B is fitted in a suitable socket in the handle so as to be always at hand. It is, of course, necessary to make the fastening of the handle to the blade very secure against even the slightest play. The edge of the handle being applied to the edge of any work to be marked, the back of the blade serves in exactly the same manner as the edge of the ordinary try square. Its great convenience should ensure it a rapid introduction.

This invention, one of the simplest ever produced, was secured by Letters Patent, May 12, 1856. For further particulars, address H. Williams, assignee, Atlanta, Georgia. Jackson Gorham is the inventor.

Photographing on Wood.

In preparing wood engravings—such as are employed in all books and newspapers where the pictures are printed on the same sheet and at the same time with the types or letter-press—the picture is first drawn by hand on the smooth block of wood, and the lines and shades are subsequently raised, or rather the white surface is *sunk* by the skill of the engraver. A patent was issued on the 5th of May last to R. Price, of Worcester, Mass., for a process of photographing on wood in lieu of drawing by hand, which has since been so far developed by the proprietors, C. J. B. Waters & Co., of No. 90 Fulton street, this city, as to be pronounced successful by some of our best engravers. The surface is so prepared as to be sensitive to light like the glass or paper employed in the ordinary photographic processes, and the image of any object is thus impressed upon the block with greater accuracy than it is possible to accomplish it by human skill. We have seen some wood blocks bearing very fine pictures produced by this means, and a number of such pictures have been engraved and printed showing that it is practicable so to use them. The principal defect of such "sun pictures" for this purpose is their too great delicacy and faintness. If this can be overcome, and the pictures be produced with the vigor and strength of ordinary India ink work, the invention will very greatly facilitate the production of illustrated books and newspapers, and it is quite portable that, with practice, engravers can accustom themselves to work from these drawings as now produced, without difficulty. Another defect, that all objects beyond the focus of the instrument are represented but hazily, is probably a serious one in taking views from nature; but this may be ultimately overcome to a great extent by placing the object to be represented at a great distance, and employing an equivalent to a telescope to magnify and strengthen the image before it is thrown on the block. This latter would reduce the difference in distance of the various parts of a machine for example, and enable all parts to be equally well delineated by the action of the light. At present the invention is most successful in reducing engravings from copies. It is now in daily use for this purpose.

Our Cotton Manufactories.

The steam duck mill at Rockport, Mass., has a large surplus of goods on hand, and has suspended operations for the present. Nearly all the cotton mills of Manchester, with the exception of the Print Works, have been for some time discharging help and manufacturing less than usual, and have lately commenced working only five days a week. The same has been done in a number of other mills throughout the country. It is thought that course is better and more satisfactory to the operatives than stopping work in some rooms, and consequently turning some hands out of employ. The design is to make the cotton they now have on hand last till the first of January, when, it is hoped, they will be able to get new cotton at lower rates. The high price of cotton and the low price of fabrics are the causes universally assigned for this partial suspension. The same system of curtailing the manufacture and reducing the labor and the wages of the operatives has been adopted in England for several months past. The mills producing sbirtings, sheetings and print cloths, have been operated only forty hours per week.

This expedient was very generally adopted in the year 1850, when the price of cotton advanced to about the present rate. It may prove useful to gather information from past experience, to govern operations on a recurrence of similar events. The Providence *Journal* publishes a list of seventy mills—including many of the largest in the country—which were entirely stopped in 1850, while others were worked half time to enable prices to assume a better shape. The price of cotton was then about 15 cents per pound, and the price of printing cloths averaged 5 1 2 cents for 60×64 picks. The price is now about 17 cents per pound, and of the same style of printing cloths, 6 cents per yard.

Preserving Fresh Meat.

As supplemental to our remarks in No. 46, this volume of the Scientific American on the importance of some device for the successful preservation and transportation of fresh beef from new and distant sources to supply the markets of our Atlantic cities, we translate the following from the *Polytechnische Journal*, which appears under the heading of Robert's Process for Preserving Meat :—

By this process, all vegetable and animal substances can be preserved without losing any of their peculiar qualities, and without change in form or appearance. As regards meat, it must be observed that the meat must be freed from blood and all the watery parts, and then exposed to a current of air until it has lost its surplus natural humidity. Whole members of the animal, or large pieces, are better fit for the process than thin slices. After the meat has been sufficiently dried in the open air, it is suspended by a rope in a reservoir, and care must be taken that the several pieces are so far separate each from the other as to give free access to the air from all sides. Any box, cask or apartment made of boards, or a common room, may serve for the reservoir, if the walls of the latter have been covered over with boards or sized paper. This reservoir has to be closed hermetically against the external air; the doors have to be lined with felt or india rubber, so as to close up air tight. On the upper part of this reservoir a lead pipe is provided, by which the air escapes—a similar contrivance is provided on the lower part. After the pieces of meat or other substances have been suspended in the reservoir, a current of sulphurous acid gas is let into the lower part. This effect is produced by driving into the reservoir, by a pair of bellows, a current of air, whi h in its passage, goes through a closed vessel wherein sulphur (brimstone) is kept burning. If the plug on the upper part, which must also be of lead, be opened, the atmospheric air is driven out of the reservoir by the sulphurous acid gas, and as soon as the latter is seen to escape freely from the same pipe on the top, the reservoir is closed. The substances have to be kept in the reservoir filled with the gas for a time, which is in proportion to their volume or weight. Pieces weighing four or five pounds only require about ten minutes, while large pieces of one hundred to two hundred pounds weight require twenty to twenty-five minutes. After the pieces have thus been penetrated by the gas they are taken out of the reservoir and dried in the open air. After this, the substance is covered by a very thin layer of varnish, prepared from two pounds of albumen dissolved at a temperature of 136 to 140 degrees in one quart of a strong decoction of marshmallow root, to which a little molasses has been added. This varnish is applied with a fine hair brush, and care must be taken to reach all the corners and crevices of the substance.

Meat treated by this process remains perfectly fresh and good, and can be used as if just received from the butchers. Fowl, (with or without feathers), fish, fruit, and all kinds of vegetables can be preserved by this process.

Substances prepared as described may be sent to any distance if packed up in barrels and covered over with tallow or lard, which latter article, however, must be kept at as low a temperature as possible. If heated too much, it generates fermentation.

Bole-Ammoniac.

As this substance is extensively used for coloring several comestibles, sauces, &c., particulary anchovy sauce, it is but justice to the public that they should be made acquainted with its nature and composition; they can then use their own discretion as to eating it, or merely regarding it as an adulteration. Although this article is generally distinguished by the name at the head of this paragraph, its proper title is Armenian-bole. The word "bole" is no doubt derived from *bolus*, a pill. because it was formerly used in medicine; and Armenia is the country that supplies it. Armenian-bole is a mixture of whiting, or chalk, and the oxyd or rust of iron. When artificially prepared, it is made of chalk and red ochre, the ochre being a compound of iron. The resulting mixture has a coloring power almost equal to the natural product. When eating substances which are colored with bole, we should remember that we are devouring a certain quantity of iron. Now, iron in any form, when taken into the stomach, has a powerful medicinal action, and when administered by a physician's advice it is rarely given in doses of more than from half a grain to three grains. How far, therefore, we are justified in swallowing ten or twenty times this quantity at a meal, we must leave the reader to decide; and althongh we do not wish to influence any man's taste, yet in holding up the colored veil of his food to the light of science, we may perhaps properly influence his judgment as to "What to eat, drink, and avoid."

Septimus Piesse.

United States Residence Registry.

We have received a circular describing a plan by which lost friends may be enabled to find each other. The project is to establish an office in Washington, D. C., where anybody who chooses will register his or her name, at an expense of twenty-four cents, or will be informed of the whereabouts of any other person whose name is registered. The circular adds that it is proposed to be made a government affair. The scheme seems worthy of attention.

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J. B., of N. Y.—The "cylinders of steam engines and the upper parts of boilers and locomotives" are generally covered with felt, and with wooden "lagging,"—both good non-conductors, and forming a better protection against radiation than the plan you propose. There would, moreover, be nothing patentable in polishing them, for the cylinders of stationary engines are often (especially in Europe) either turned and polished up bright, or painted white, for the purpose of preventing radiation of heat; and it is common to apply bright sheet brass or Russia iron outside of the wood and felt.

D. W. T., of N. H.—"Tredgold on the Steam Engine" contains the information you desire. The section of that work relating to locomotives costs, we believe, somewhere about $15. Very possibly "Colburn on the Locomotive," costing $1, will answer your purpose, or Norris' Hand Book of the Locomotive, costing about $1 50. Oscillating cylinders have not, to our knowledge, been used for locomotives, though we have seen several models of them with such cylinders. They would be objectionable on account of the very high speed at which locomotive engines are sometimes compelled to work.

H. S. C., of Ill.—The cause of the heat developed by friction is mysterious. Mechanical power seems to be changed into heat—one being annihilated and the other created by the operation. That the heat is not drawn from surrounding bodies, nor developed from a latent condition, has been demonstrated by careful experiment. We cannot furnish all the back numbers you ask for.

C. E. L., of Mo.—Your method of raising water by steam is similar to what is known as Savary's engine, and is over two hundred years old. The employment of the exhaust steam of an engine for this purpose would not be patentable.

A. P., of Pa.—Your scheme of printing the backs of all bank bills under the supervision of the State authorities, with devices difficult to counterfeit, and which all could readily become familiar with, has many objections. The check it would afford against over issue on the part of the banks would be something in its favor, but would prove a serious annoyance to the regular business of the bank.

F. C. M., of N. Y.—Your communication on the cause of gravitation, etc., is not of sufficient interest for publication.

J. K., of Pa.—The pearls in fresh water muscles and clams, like those in salt water shellfish, are found in the throats of the animals. When they grow so large as to touch the shell, they lose their color, and are worthless.

A H., of N. Y.—Your plan of allowing a locomotive steam plow move itself by "overhauling" a chain seems to involve all the principal difficulties of both the locomotive and fixed engine system, rather than avoid either

J. B., of ——.—Address H. Wells & Co., of Florence, Mass., for information in regard to circular saw mills.

C. H., of S. C.—We regret that we have not a single copy of Macfarlane's History of Propellers to send you We think you can procure it of H. C. Baird, of Philadelphi .

J. W. T., of Ind—Your plan of propelling canal boat was suggested 25 or 30 years ago, and substantially the same thing is published in Vol. 5, Scientific American.

A. S. McO., of N. Y.—There is no substance known which will "cut off the power of the magnet." The mutual attraction of a magnet and a piece of iron or of two magnets for each varies in certain ratio with the distance and without regard to any substance interposed between. If you have a material which will, as you say, prevent the attraction being felt through it, the discovery is valuable.

W. W., of Pa.—The scrap you refer to, which still we think continues to be copied among "curious facts" in many books and newspapers, is complete fallacy. Whirlpools in water or any other fluid are as willing to revolve in one direction as the other, and always turn in the direction in which the greatest impulse is received.

J. B. C., of Ala.—Your plan of propelling vessels by forcing out currents of air from the stern under water is one of the oldest and weakest on record. It is very wasteful of power, so much so that on some trials the full force of powerful engines applied to blowing cylinders for the purpose were unable to stretch the hawsers which held the vessel to the wharf.

J. S. K., of N. J.—We cannot inform you how the perpetual motions on exhibition at Barnum's Museum are impelled. They were got up by the same man that constructed the one exhibited last year in this city, which we treated at some length. They are a puzzle to us.

L. R. M., of R. I.—The quickest passage ever made across the Atlantic was by the Persia on her last voyage. She ran from land to land in 8 days 22 1-2 hours, and from dock to dock in 9 days 3 hours and 20 minutes clock time. The sea was very smooth and clear the whole passage. This, like nearly all the quick trips was the outward passage, or from New York to Liverpool.

T. H. M., of Vt.—Your communication is interesting, but not of a practical and direct importance suited for our columns.

C. J. N., of N. Y.—There is a Spanish, a French, a Welsh, and several German newspapers printed in this city in their proper type and language, Of journals in English type there are several Irish papers, one English, the Albion, and one Scotch, recently started, an exceedingly fine looking and well conducted sheet, the Scottish American Journal. There are no especial agencies for the foreign mechanical journals except of the Artizan, 74 Bowling Green, and the Practical Mechanics' Journal, 351 Broadway, but any respectable periodical dealer can procure them. Wilmer & Rogers, 42 Nassau st., are general agents for everything foreign.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, Aug. 8, 1857:—

S. C., of Va., $25; J. B., of Ohio, $25; C. D. T., of Ill., $25; A S., of N. Y., $25; H. DeW., of ——, $20; F. P., of Pa., $35; H. B., of N. Y., $800; W. W., of Mo., $25; R. H. L., of Pa., $55; J. G., of N. H., $15; M. L., of N. Y., $250; O. N., of Pa., $100; Z. & B., of Mo., $25; A. C., of Iowa, $10; S. L. W., of Pa, $10; A. H., of Conn., $21; J. McL., of N. Y., $30; J. N. W. of Ill., $25; McN. & G., of Ill., $30; S B., of Ill., $10; H. W. C., of N. Y., $30; L. T. & Co, of R. I., $25; O. & Z. W., of N. J., $30, G. S, of N. Y., $25; B. C., of N. J., $25; L. F. H., of N. J., $25.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Aug. 8, 1857:—

P. S., of N. Y.; J. B., of Ohio; B. C., of N. Y.; J. N. W., of Ill.; B. B., of Conn.; S. L., of Ga.; G. D. L., of of N. Y.; C. D. T., of Ill.; A. S., of N. Y.; S. C., of Va.; Z. & B., of Mo.; C. A. W., of Mass.; I. L., of R. I.; W. F., of N. Y.; W. W., of Mo.; A. C., of Iowa; L. F. H., of N. J.; O. L. & D., of Ohio.

NOTICES.

INVENTORS AND PATENTEES will bear in mind that the editors of the Scientific American are conducting the most extensive American and European Patent Agency in the world. They have offices in New York, Washington, London, Paris and Brussels, through which they prosecute applications for patents upon such terms as have not failed to bring them a business in extent far beyond that of any other agency in this country. This clearly shows the confidence reposed in us by inventors generally. We have no new or peculiar process to advertise, by which the business is to be done. We proceed according to law; and we have found that, after an experience of nearly twelve years, no other system, however peculiar, can equal it. Inventors should never trust their business to inexperienced persons. If they wish to have their papers prepared to stand a legal test, they should be cautious to employ agents experienced in the business. Circulars of information sent free.

BACK NUMBERS OF THE PRESENT VOLUME—Almost every mail brings letters of inquiry from our patrons for certain numbers of the SCIENTIFIC AMERICAN, which we are unable to supply. To save subscribers the trouble of writing for such numbers as we have not got, we append a list of the numbers which are entirely exhausted in Vol. 12:—1, 2, 3, 4, 6, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 21, 22, 23, 24, 27, 30, 31, 35, 36, 39. Those numbers that are not specified above we can supply, and shall be happy to do so to those who have missed them.

Terms of Advertising.

Twenty-five cents a line each insertion. We respectfully request that our patrons will make their advertisements as short as possible. Engravings cannot be admitted into the advertising columns.

☞ All advertisements must be paid for before inserting.

AMERICAN AND FOREIGN PATENT SOLICITORS.—Messrs. MUNN & CO., Proprietors of the SCIENTIFIC AMERICAN, continue to procure patents for inventors in the United States and all foreign countries on the most liberal terms. Their experience is of twelve years' standing, and their facilities are unequalled by any other agency in the world. Consultation may be had with the firm between nine and four o'clock daily, at their principal office, 128 Fulton st., New York. Our branch offices are corner of F and Seventh sts., Washington, D. C., Nos. 66 Chancery Lane, London, 29 Boulevard Saint Martin, Paris, and 3 Rue Therrsienne, Brussels. Circulars of information concerning the proper course to be pursued in obtaining patents through our Agency, the requirements of the Patent Office, etc., may be had gratis upon application to the principal or either of the branch offices. Communications and remittances should be addressed to MUNN & CO.,
No. 128 Fulton st., New York.

WYCKOFF'S PATENT TUBULAR BORING Machine—See Scientific American, Vol. 12, No. 25, for cut and description. Adapted to boring water pipes, all kinds of pumps, wagon hubs, chain pump tubing, &c., boring ten feet per minute without backing out for chips, is now in successful operation in most of the Northern and Middle States. It is the only machine of the kind ever invented that will bore a perfectly smooth hole through all kinds of timber without deviation. Will be on exhibition at the United States Fair at Louisville, Ky., and at the State Fairs in New York and Pennsylvania, this Fall. For further particulars inquire of A. WYCKOFF, Elmira, Chemung co., N. Y. 1*

MECHANICS' FAIR—The fourth Exhibition of the Worcester County Mechanics' Association for the Encouragement of Manufactures and Mechanic Arts, will be opened at the Mechanics' Hall, Worcester, Mass, on Thursday, Sept. 17, and continue two weeks. The Association respectfully invite the mechanics, manufacturers, artists and inventors of Massachusetts and adjoining States, to furnish such specimens of their various productions of labor and skill as they may wish to present to the notice of the public through the medium of a Fair.—Steam power will be furnished for operating such machinery as may be presented for exhibition. Silver and bronze medals, Diplomas, and gratuities in money will be awarded to articles of merit, and a copy of the Reports furnished to each contributor. It is desirable that all articles intended for the Exhibition should be presented on or before Wednesday, Sept. 16th. Communications addressed to the Superintendent will be promptly attended to. PUTMAN W. TAFT, Sup't. 49 2*

FOR SALE—The patent right of an Automatic Fan, patented June 9, 1856 State rights in sections or in general An opportunity is here offered to cabinet makers, furniture dealers, and capitalists in general. Will be sold to the highest bidder. For further particulars address L. REBSTOCK and N. REIMEL, 6 Myer's Court, Race, below Sixth st., Philadelphia. 1*

AMERICAN INSTITUTE—Special Premium for the best High Pressure Steam Engine. The Managers of the Twenty-ninth Annual Fair of the American Institute will award a special premium of the large Gold Medal, accompanied by a Diploma, for the best High Pressure Steam Engine; the cylinder of which must be 12 inches diameter, the length of stroke at the option of the builder. The said engine to be tested during the 29th Annual Fair at the Crystal Palace, in the city of New York, under the inspection of four competent engineers, to be appointed, one from each of the following States, viz., Massachusetts, Rhode Island, New York and Pennsylvania. The merits of the engines to be determined on the following points: First, the least amount of fuel consumed. Second, the most uniform speed. Third, the least cost of engine. The mode of trial to be determined by the Judges. Those wishing to exhibit for the above premium are requested to give early notice as above. By order of the Managers, WM. B. LEONARD, Agent.
1 351 Broadway, New York.

THE TENTH ANNUAL EXHIBITION of the Maryland Institute, Baltimore, will be opened on the 29th of September, and continue to the 2th of October, 1857. Goods for competition and premiums will be received from 22nd to 24th of Sept. inclusive, afterwards for exhibition only. Mechanics, manufacturers, inventors, artists and others, of the entire country, are respectfully solicited to contribute to the same, and assured that every effort will be made to display their works to the best advantage. Circulars containing rules, regulations, &c., will be promptly furnished by application to JOHN S. SELBY, Actuary.
49 tf JOSHUA VANSANT, Chairman.

CAUTION—The public are hereby cautioned against purchasing any interest in a patent granted to Wm. H. Walton, dated 9th December, 1855, and re-issued to him, except from Wm. H. Walton personally, who alone has the legal right of disposing of the same. For further information address WM. H. WALTON & CO., 191 and 193 Chrystie st., New York. 49 2*

$100,000 WORTH OF INVENTIONS for sale by JAMES W. CHAPMAN, Trinity Springs, Martin co., Ind. 49 2*

PROSSER'S PATENT SCROLL SAW has neither sash, slides, nor springs; can be run at thrice the usual velocity, working much more smoothly and rapidly than any other saw. Price complete, on iron frame, $60 LANE & BODLEY, manufacturers of wood-working machinery, Cincinnati, Ohio. 49 4*

"People kill themselves by eating, by drinking, by labor, by sleep, by want of sleep, by sexual excess, by taxation of brain, by money-making and spending, by extended violation of physical law, in almost every direction. Now the Water Cure Journal contemplates a rectification of the general habits of the people in all cases where correction is needful."—DR. JACKSON.

THE WATER CURE JOURNAL—Devoted to Hydropathy, its philosophy and practice; to Physiology and Anatomy, with engravings; to Bathing, Dietetics, Exercise, and to all those laws which govern life and health. Monthly, only $1 a year. Address FOWLER & WELLS, 308 Broadway, New York. 49 2

MECHANICS' FAIR IN LOWELL—The Second Exhibition of the Middlesex Mechanic Association will open in Lowell, Mass., September 10, 1857. Contributions will be received until September 5. For information address JOHN W. SMITH, Sup't. 49 3*

FOR SALE AT FLUSHING, Long Island, N. Y.—The business and machinery of John C. Quarterman's estate, consisting of a six-horse power steam engine, a ten-horse power boiler, lathes, saws, boring and drilling machines, rounding machines, saws for scroll work, and a machine for making shovel, coal hod and pail handles, together with all the tools and fixtures. The business has been established from the year 1851, and to an ingenious mechanic opens a good prospect. For particulars apply to JAMES QUARTERMAN, 114 John st, New York. or to SARAH ANN QUARTERMAN, Flushing, L. I, who resides on the place. 49 6

TO HOUSEKEEPERS—I own the copyright of the celebrated 100 Metropolitan Hotel recipes for Cooking, Baking, making Creams, Pastry, Preserves, &c., &c, and will send them by return mail (free of postage) on receipt of four letter stamps. J. R. STAFFORD, 16 State st, New York. 49 4

MACHINISTS' TOOLS—CARPENTER & PLASS 479 First ave., New York, have constantly on hand and make to order all kinds of machinists' tools of superior quality, particularly adapted for railway companies, steam engine builders, &c., whose orders are respectfully solicited, and shipped at short notice—terms moderate. Also a few second-hand tools, one 16 ft. and one 8 ft. iron planer, two slide lathes, 12 and 16 ft., and one 8 ft. face lathe. 49 2*

TO PATENTEES AND PURCHASERS—The subscriber will examine or experiment on the working of new machines and processes, prepare elaborate reports, and give professional opinions for public or private use. Refers to Munn & Co. THOS. D. STETSON, Consulting Engineer, 5 Tryon Row, New York. 45 tf

INCRUSTATION IN STEAM BOILERS—A late patent for removing and preventing incrustation in steam boilers. It has been thoroughly tested, and in every instance has given full satisfaction, by removing all old scale, and preventing the formation of new, keeping the boilers entirely free from incrustation without injury to the iron. Satisfactory proof of its good effects will be given to any wishing to purchase. For sale in individual or state rights. Address Messrs SPENCER, BOARDMAN & SPENCER, Lancaster, Pa., sole agents for the United States. 48 4*

OHIO MECHANICS' INSTITUTE, Cincinnati.—Fifteenth exhibition of Arts and Manufactures. We desire to call the attention of Manufacturers, Mechanics, Artists, Inventors and others to the above Exhibition, which will be opened in Cincinnati on Thursday, Sept. 10th, and continue daily until the 30th, in a commodious fireproof building, which has been erected for the purpose It is desirable that those intending to exhibit articles should give early notice to J. B. REICH, the Clerk of the Institute, who will promptly give any information that may be desired. By order of the Committee. C. F. WILSTACH, Chairman of the Committee. 48 2

WANTED—A second-hand Locomotive Steam Boiler, of about thirty horse power, capable of working at 75 lbs. pressure. Address, stating dimensions and price, D. POWERS & SONS, Lansingburgh, N. Y. 48 3*

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SECOND-HAND Steam Engine and Boiler for sale.—One 8-horse Upright Steam Engine, Boiler 30 inches diameter, 25 feet long, nearly new, and in good running order. For particulars address H. B. MATHER, West Norwalk, Fairfield co., Conn. 48 3*

FISHERMEN—If you wish to catch any kind of fish as fast as you can pull them out, get Gardner's Secret Art for Catching Fish, sent for $1. N. R. GARDNER, Peace Dale, R. I. 47 4*

WOODWORTH PLANING MACHINES of superior style and workmanship, of various sizes, and the latest improvements Also Steam Engines and Boilers, Sash and Blind Machinery, Lathes, Planers, Drills, Belting, and all kinds of Machinists' Tools on hand, and for sale at the Machine Depot, 163 Greenwich st., New York. A. L. ACKERMAN. 45 8

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CAST STEEL WIRE DRAWING at the Union Works, Paterson, N. J. Orders solicited and carefully filled by CHAMBERLIN & CO. 43 13*

PORTABLE STEAM ENGINES.—S. C. HILLS No. 12 Platt st., N. Y., offers for sale these Engines, with Boilers, Pumps, Heaters, etc., all complete, and very compact, from 2 to 10 horse power, suitable for printers, carpenters, farmers, planters, &c. A 2 1-2 horse can be seen in store, it occupies a space 5 by 3 feet, weigh 1500 lbs., price $240; other sizes in proportion. 28 e3w

SWISS DRAWING INSTRUMENTS—A full stock of these celebrated instruments always on hand. Catalogues gratis. AMSLER & WIRZ,
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ENGINEERING.—The undersigned is prepared to furnish specifications, estimates, plans in general or detail of steamships, steamboats, propellers, high and low pressure engines, boilers and machinery of every description, Broker in steam vessels, machinery, boilers, &c. General Agent for Ashcroft's Steam and Vacuum Gauges, Allen & Noyes' Metallic Self-adjusting Conical Packing, Faber's Water Guage, Sewell's Salinometers, Dudgeon's Hydraulic Lifting Press, Roebling's Patent Wire Rope for hoisting and steering purposes, Machinery Oil of the most approved kind, etc.
27 eowtf CHARLES W. COPELAND, Consulting Engineer, 64 Broadway.

WOODWORTH'S PATENT PLANING MACHINES of every kind and all prices. A large assortment on hand; and I am prepared to construct an machine to order from ten days to two weeks, and guarantee each machine to be perfect in its construction, and give purchasers entire satisfaction. The patent has expired, and will not be renewed. I make this business exclusive, manufacturing nothing but the Woodworth Machines, and for that reason can make a better article for less money; and with my fifteen years' experience I fully guarantee each machine to come up to what I am willing to recommend, that is, that each machine shall be more than equal to any other manufactured for the same price. JOHN H. LESTER, 57 Pearl st., Brooklyn, N. Y., three blocks above Fulton Ferry. 35 tf

PEARSON CROSBY'S PATENT RE-SAWING Machines.—The Crosby patent for re-sawing lumber, having been re-issued April 28, 1857, and having purchased the right to the same for the State of New York and Northern Pennsylvania, the subscriber is prepared to sell rights to use the machines in the greater portion of the above named territory, and also to furnish the public with these machines. Having re-built my machine manufactory—which was destroyed by fire on the 9th of Feb. last—I continue to manufacture and have on hand for sale, Woodworth's Patent Planing Machines, from $150 to $1,500, and of a quality unequalled by any other manufacturer. Also the separate parts of the machine, namely, planing knives, side tools, side cutter heads, cylinders, &c., as well as the above named Crosby Re-sawing Machines. JOHN GIBSON,
48 13* Planing Mills, Albany, N. Y.

STEAM PUMPS, Boiler Feed Pumps, Stop Valves, Oil Cups, Cocks, Steam and Water Gauges, sold by JAMES O. MORSE & CO., No. 79 John street, New York. 41 13

BOILER FLUES—All sizes, and any length desired, promptly furnished, by JAMES O. MORSE & CO., No. 79 John street, New York. 41 13

WROUGHT IRON PIPE—Plain and galvanized sold at wholesale, by JAMES O. MORSE & CO., No. 79 John street, New York. 41 13

ENGRAVING ON WOOD and **MECHANICAL** DRAWING, by RICHARD TEN EYCK, Jr., 128 Fulton street, N. Y., Engraver to the Scientific American. 16tf

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MACHINE BELTING, Steam Packing, Engine Hose.—The superiority of these articles manufactured of vulcanized rubber is established. Every belt will be warranted superior to leather, at one-third less price. The Steam Packing is made in every variety, and warranted to stand 300 degs. of heat. The hose never needs oiling, and is warranted to stand any required pressure; together with all varieties of rubber adapted to mechanical purposes. Directions, prices, &c., can be obtained by mail or otherwise, at our warehouse NEW YORK BELTING AND PACKING COMPANY John H. Cheever, Treasurer, No. 6 Dey street, N. Y 40 tf

PECK'S PATENT DROP PRESS—The best machine in use for stamping jewelry, ornaments, tin ware, swedging iron, &c. A supply of all sizes on hand and made to order by the patentee, MILO PECK, New Haven, Conn. State rights for sale. 48 8*

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STEAM ENGINES, Steam Boilers, Steam Pumps, Saw and Grist Mills, Marble Mills, Rice Mills, Quartz Mills for gold quartz, Sugar Mills, Water Wheels, Shafting and pulleys. The largest assortment of the above in the country, kept constantly on hand by WM. BURDON, 102 Front st., Brooklyn, N. Y. 46 tf

L. D. GOODWIN'S celebrated Patent Central Vent Water Wheel For wheels or the right of territory address J. W. DWIGHT, Dryden, N. Y., or E. C. BRAMHALL, 190 Fulton, N. Y. 44 10*

LAP-WELDED IRON BOILER TUBES.—Prosser's Patent.—Every article necessary to drill the tube-plates, and set the tubes in the best manner.
44 26 THOS. PROSSER & SON, 28 Platt st., N. Y

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THE BEST PLANING MACHINE IN THE World—Patented Nov. 21, 1854 and Nov. 13, 1855. These patents were obtained for improvements upon the celebrated Woodworth Planing Machine. They received a Gold Medal at the last exhibition of the Massachusetts Charitable Mechanics' Association. Machines of all kinds and sizes constantly on hand, which are warranted to give entire satisfaction, and to be superior to any now in use For further information address the patentee, JAMES A. WOODBURY, No. 1 Scollay's Building, Court st, Boston, Mass. 42 13*

OIL! OIL! OIL!—For railroads, steamers, and for machinery and burning—Pease's Improved Machinery and Burning Oil will save fifty per cent., and will not gum. This oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough, and practical test. Our most skillful engineers and machinists pronounce it superior and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The Scientific American, after several tests, pronounced it "superior to any other they have ever used for machinery." For sale only by the inventor and manufacturer.
F. S. PEASE, 61 Main st., Buffalo, N. Y.
N. B.—Reliable orders filled for any part of the United States and Europe. 40 tf

NEW HAVEN MFG. CO.—Machinists' Tools, Iron Planers, Engine and Hand Lathes, Drills, Bolt Cutters, Gear Cutters Chucks &c., on hand and finishing. These Tools are of superior quality, and are for sale low for cash or approved paper. For cuts giving full description and prices, address, "New Haven Manufacturing Co., New Haven, Conn. 40 tf

HARRISON'S 30 INCH GRAIN MILLS—Latest Patent.—A supply constantly on hand. Price $200. Address New Haven Manufacturing Co., New Haven, Conn. 40 tf

SCREW BOLTS with Square, Carriage or Countersunk heads, bolt ends, square head wood screws, set screws, machine screws, ratchet & breast drills, standard steel and shrinkage rules for sale, by CHAS. MERRILL & SONS, 556 Grand st., New York. 46 5*

MECHANICS AND MANUFACTURERS—Tennessee Exhibition. The Third Annual Fair of the Mechanics' Institute of Tennessee will be held at Nashville in October next. Exhibitors from all the States will be permitted to enter articles and compete for the first premiums. For particulars address WM. STOCKELL, President, or H. K. WALKER, Secretary. 45 5

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Science and Art.

Coal in the United States.

We have in recent articles called attention to the quantity and quality of the iron and copper within the territory of the United States, and wish now briefly to refer to the supplies of fossiliferous fuel. The miniature map accompanying is too small to represent all the coal fields minutely, were there sufficient knowledge extant to make it practicable to compile such; but it is believed to be a correct general representation of the coal fields of our country. The fields in the British Provinces, from which are derived the Pictou coals sold in our Atlantic ports, are not attempted to be represented with any precision.

At a general glance, the whole triangular basin enclosed between the Alleghanies on the east, the great plains of the Far West, and the high lands of Upper Canada on the north, is one vast coal field. On closer inspection this may be divided into two, the great Pennsylvania field, covering almost the whole of that State and stretching down to the center of Alabama, and the Illinois coal field, which, with more or less interruption, extends from near the northern portion of Michigan into the northern portion of Arkansas. The immense partially-explored regions of the West have revealed coal at several points, which, in the absence of anything more definite, we have denoted by very strong black patches; but since the preparation of this map, a study of the surveys for the Pacific Railroad has brought to our knowledge the existence of coal at many additional points, one of which is at or near the northernmost bend in the Missouri.

Nearly all the coal under the immense area blackened is bituminous coal. Anthracite, most used in Eastern cities, comes from a number of small fields lying out of the main field on the east, as shown by several slight patches near Philadelphia. There is what is termed by geologists the Rhode Island coal field, extending as represented, into Massachusetts; but although science shows the substance thence procured to be actually coal, it possesses one important defect—it will not burn.

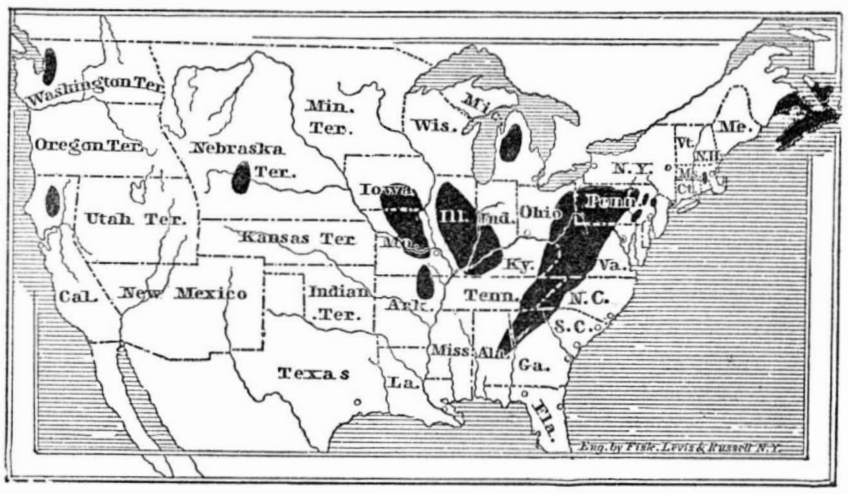
We cannot attempt, in a brief space, to explain the causes which are supposed to have produced the great deposits of valuable fuel which we find beneath the earth's surface, further than to remark that it is demonstrated to be wood, preserved from decay by an air tight covering of earth, which has been converted into its present condition by the action of time, pressure, or heat, or all of combined. The eastern outskirts of the Pennsylvania field has been more fully roasted, or coked, and reduced to anthracite, while the Rhode Island field has been so intensely burned as to reduce it almost or quite to cinder.

The coal which is revealed in the great Rocky Mountain region, although it may furnish liberal supplies at some points for hundreds of years, it cannot possibly belong to any such great beds as those in the settled portions of the States. The area of the coal beds proper is estimated by Prof. Rogers at 200,000 square miles. This is believed to be far greater than the area of all the coal fields of Europe, and somewhat larger than those of the whole of Europe, Asia and Africa. It is useless to attempt to calculate how long this supply of coal will last, as the consumption is increasing every year with the increase of steam power; but the fields of anthracite alone could supply the world for a very long period before it would be necessary to touch upon the margins of the great fields. Great Britain has a far nearer prospect of exhausting her supply. We now mine only 9,000,000 tuns annually. Great Britain mines (and burns or sends abroad) 65,000,000 tuns each year. If the consumption continues to increase at its present rate, the fields now most worked in Great Britain will be exhausted in about 300 years, and her whole supply in about 2,000 years more.

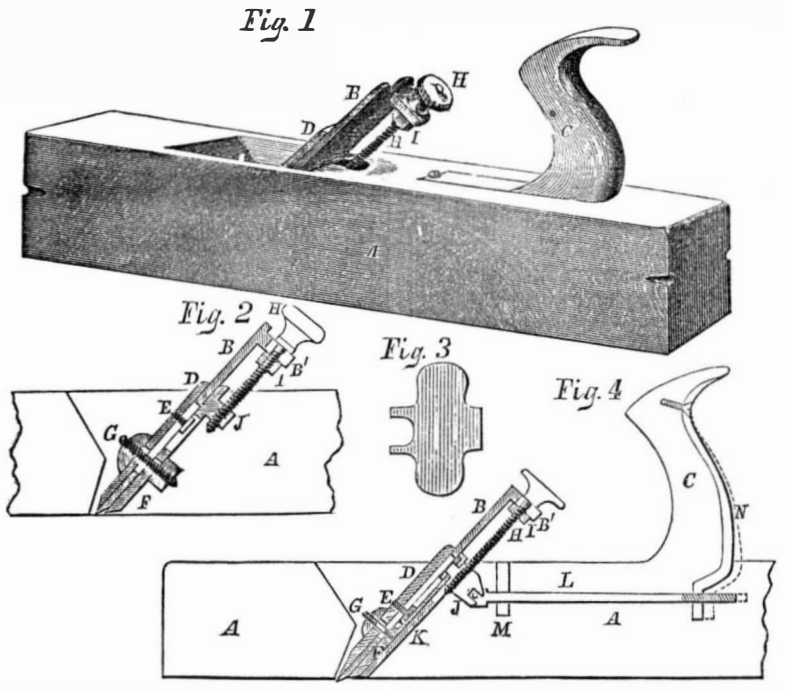
Layers of coal vary in thickness from little exceeding that of a sheet of paper up to fourteen feet or more in thickness. The coal fields here represented generally include thick valuable layers, and the greater part contains a considerable number of strata of coal, several of which are workable, with common earth and rock between them.

The number of strata decrease westward. According to a late paper by Prof. Rogers, the number of coal seams in Nova Scotia is about fifty, though only five of them are of workable thickness, being equivalent to about twenty feet of coal. The deepest anthracite basin of Pennsylvania, that of the Schuylkill, contains also about fifty coal seams, and twenty-five of these have a thickness each of more than three feet, and are available for mining. Further west, the great Appalachian, or, as we have here termed it, the Pennsylvania coal field, contains about twenty beds in all, ten of which are thick enough to be mined. Still further onward the broad basin of Indiana and Illinois shows apparently not more than ten to twelve beds, and it is believed that only seven of these are thick enough and pure enough for mining. Northward, in the Michigan coal field, there are only two or three layers, and these lay so low that the expense of draining mines by pumping will long forbid successful coal mining in that locality. Still further westward, the coal field of Iowa and Missouri contains, it is believed, but three or four beds of profitable size, and the total number, thick and thin, does not exceed six or seven. A similar gradation is noticeable in the general size of the individual coal seams, by far the thickest being in the anthracite basins of Eastern Pennsylvania. The coal in the Western territories is generally thin.

THE AMERICAN COAL FIELDS.



PALMER'S PARAGON PLANE.



The accompanying engravings represent two varieties of an improvement in planes. Both are well adapted to allow of a perfect adjustment of the "iron" without bruising or springing the stock, and the second ingeniously provides for automatically elevating the iron as the plane is drawn back over the lumber. It is the invention of J. F. Palmer, of Auburn, N. Y., and was patented Feb. 3d, 1857. Fig. 1 is a perspective view, and Fig. 2 is a longitudinal section in its simplest form; Fig. 3 is a wrench used for adjusting the parts, and Fig. 4 a longitudinal section of the most complete form, that in which the iron is raised on the return movement. A is the body or stock, B the iron and B' a horn or lug projecting laterally from the top of the iron. C is the handle provided with a peculiar spring, N, in Fig. 4, which will be described below. D is the cap, which serves the usual purpose of rapidly breaking up or curling the shaving so as to enable the tool to produce a smooth surface on cross grained stuff. E is a screw, binding the iron and cap together. F is a substantial plate which underlies the iron. G is a screw and nut by which the iron is screwed to F. H is a screw by turning which (with G suitably slackened) the iron may be slid up and down upon F. I is a nut which serves simply as a collar on H. J is a projection on F which is tapped to receive the threads of the screw H. The operation of the plane shown in Figs. 1 and 2 is now perfectly clear. The plate F being fitted tightly into the stock and made simply to support the iron, B D, at any required height by turning the screw H.

Fig. 4 shows the additional device. In this plane the plate F is not firmly fixed in the stock, but is mounted on the additional plate K and is free to slide up and down the inclined surface thereof. The projection J, in addition to the duty performed by the corresponding part in Fig. 2, is forked to receive a pin projecting laterally from the longitudinal rod L, which latter is so mounted within the stock as to be free to move endwise. N is a spring attached to L at the base, and let into the handle so that as the hand of the operator pushes the plane forward in the usual manner it, compresses the spring, moves L forward and consequently, by its connection with J, depresses F with all its superincumbent parts. By this means the iron is depressed at each forward motion of the hand but when the plane is drawn backward, the pressure on the spring N is diminished and its elasticity induces it to assume the position shown in the dotted line, thereby drawing L backward and elevating the iron so far that at its edge an entirely above the surface of the lumber. It is evident that the injury to the edge of the iron due to the backward motion is very considerable, and probably much greater than that due to its forward motion, while the latter alone is effective in planing the stuff. By elevating it, therefore, in this manner, its sharpness is preserved much longer than when rigidly held as in the ordinary plane stock.

For further particulars the inventor may be addressed as before stated.

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